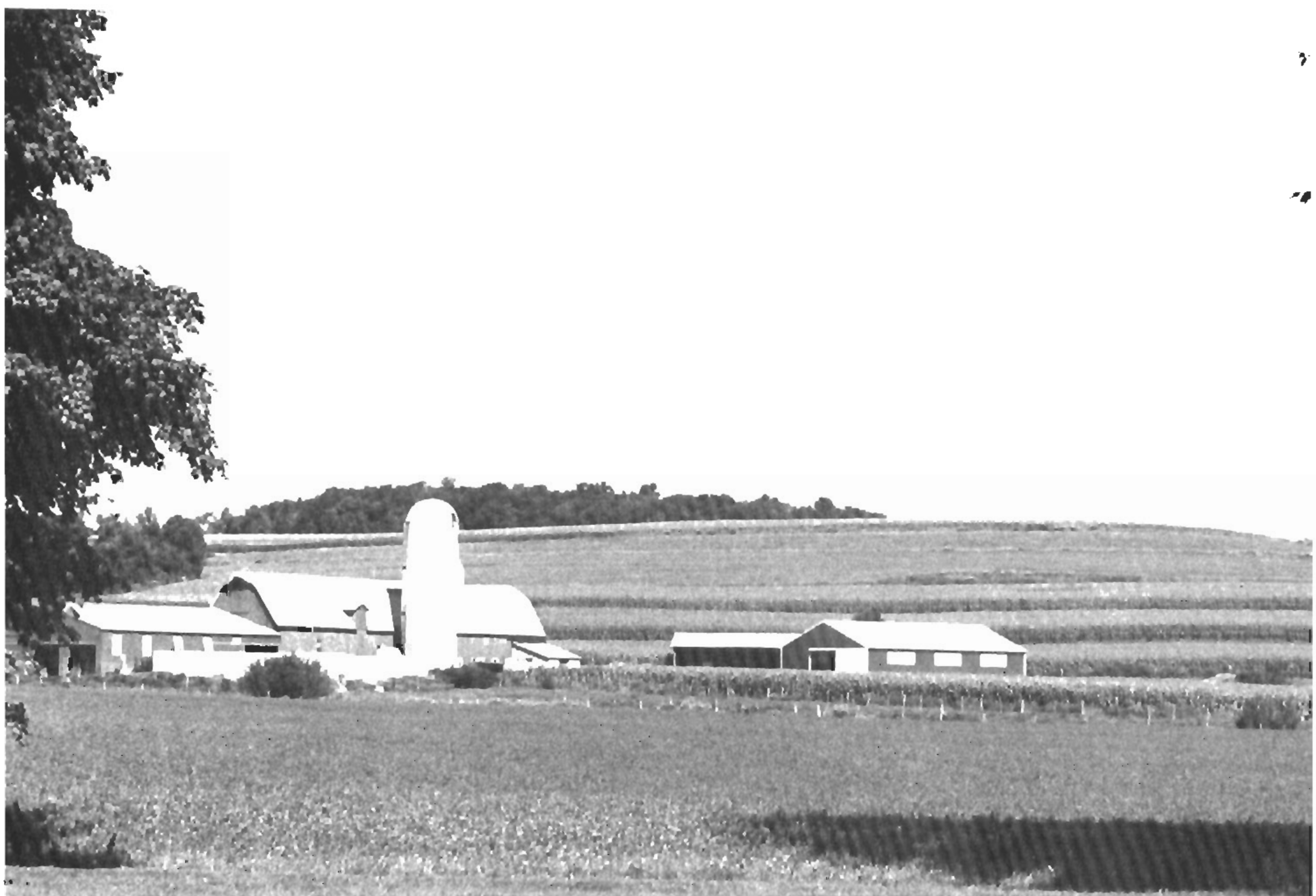
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Cornell University
Agricultural Experiment
Station

Soil Survey of Chautauqua County, New York



How To Use This Soil Survey

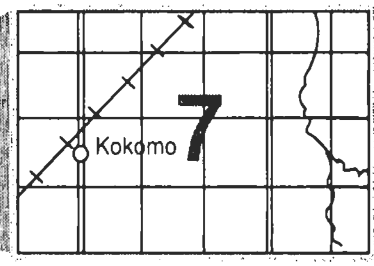
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

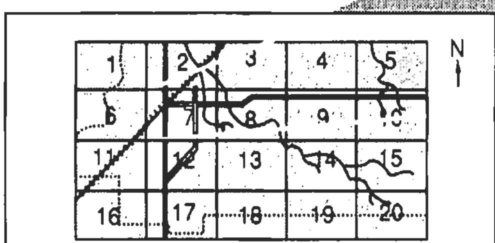
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

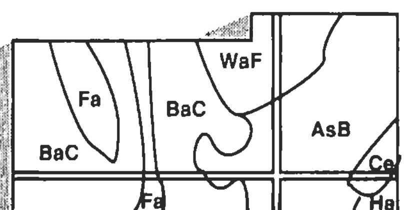
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1987. Soil names and descriptions were approved in 1988. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. It is part of the technical assistance furnished to the Chautauqua County Soil and Water Conservation District. Partial funding for the survey was provided by the New York Department of Agriculture and Markets.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Alfalfa in an area of a Chenango gravelly loam. The stripcropping in the background is in areas of Chautauqua and Busti soils. Photo by David J. Wilson, district field manager, Chautauqua County Soil and Water Conservation District.

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Foreword

This soil survey contains information that can be used in land-planning programs in Chautauqua County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Richard D. Swenson
State Conservationist
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Soil Survey of
Chautauqua County, New York

By Paul S. Puglia, Soil Conservation Service

Fieldwork by Gerald B. Brauen, Bradford A. Higgins, Renee D. Jacobson, John W. Kick, Karen A. Kotlar, Joseph S. Kraft, Stephen J. Page, Paul S. Puglia, and Gerald W. Smith, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
Cornell University Agricultural Experiment Station

CHAUTAUQUA COUNTY is in the extreme western part of New York (fig. 1). It is bounded on the north by Lake Erie; on the west by Erie County, Pennsylvania; on the south by Warren County, Pennsylvania; and on the east by Cattaraugus County, New York. Its northeast corner is bounded by the Cattaraugus Indian Reservation.

Chautauqua County has a total land area of 680,000 acres, or about 1,062 square miles *(13)*. Mayville is the county seat.

The New York State Department of Environmental Conservation manages about 18,000 acres of land used for reforestation and wildlife areas. Also, Chautauqua County manages about 1,500 acres as county reforestation areas and parks.

In 1982, about 45 percent of the land area in the county was used for farms *(15)*. Of this area, about 45 percent is cropland, 20 percent is pastureland, and 25 percent is farm woodlots.

Although Chautauqua County has more farms than any other county in New York, the number of farms in the county has steadily declined over the years. In 1945, there were 5,778 farms in the county compared to 2,134 in 1982 *(14, 15)*; however, the average size of the individual farms increased from 89.4 acres in 1945 to 143 in 1982.

Chautauqua County is in two contrasting physiographic provinces, the Erie-Ontario Plain province and the Allegheny Plateau province, and thus it supports two different kinds of farming enterprises. In the plateau province the principal agricultural enterprise is dairy farming. Corn and hay are the main crops, but some small grain is grown. In 1982, about 77,215 acres was used for hay, 27,261 acres for corn, and 3,866 acres for small grain, mainly oats *(15)*. In 1945, in contrast, 22,065 acres was used for small grain, 18,912 acres for corn, and 104,642 acres for hay.

A moderate temperature, a long frost-free period, and good soils help to make the lake plain province an outstanding agricultural area. The main agricultural

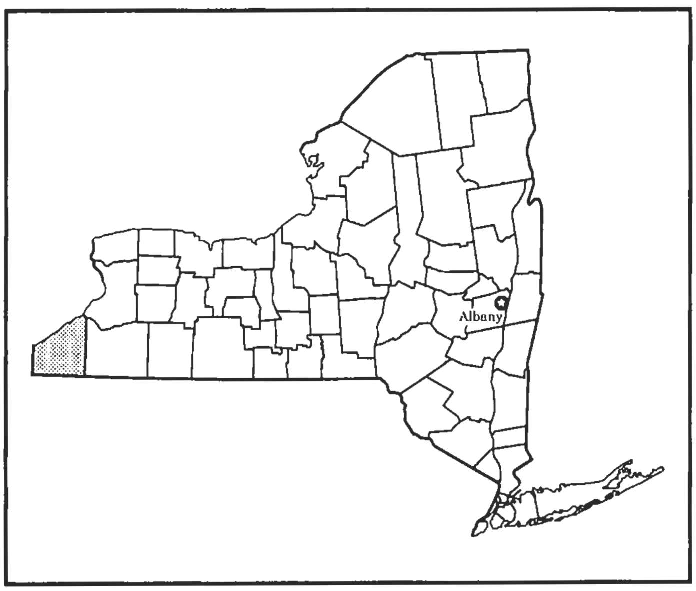

Figure 1.—Location of Chautauqua County in New York.

enterprise in this region is growing grapes; however, substantial areas are used for vegetables, orchard crops, or small fruit. Chautauqua County is the leading grape-producing county in New York, with 19,166 acres of vineyards *(15)*.

In addition to these products, maple syrup is an important commodity in the survey area. Chautauqua County currently is rated eighth among the counties of New York in the production of maple syrup, with an average annual output of about 15,000 gallons.

More than 50 percent of Chautauqua County is woodland; therefore, commercial timber production is a viable industry. Most of the natural stands are represented by mixed hardwoods dominated by sugar maple, red oak, black cherry, white ash, and American beech. Many wooded areas have been cut over several times for timber production.

This survey updates an older soil survey of Chautauqua County published in 1916 *(9)*. It provides larger maps, which show the soils and cultural features in greater detail. The present survey also provides more up-to-date soil interpretations.

General Nature of the County

This section provides general information about Chautauqua County. It describes history and development, physiography and geology, drainage, water supply, transportation facilities, and climate.

History and Development

The area that is now Chautauqua County has been called the gateway to New York State. French explorers traveled through the area in the late 1600's *(5)*. These explorers were attempting to find a southwest passage from Lake Erie to the Ohio and Mississippi Rivers. This passage was later known as the Portage Trail.

Colonel James McMahan was the first permanent settler to purchase land in the survey area. In 1801, he purchased 4,074 acres from the Holland Land Company in the present town of Ripley *(5)*. In 1808, Chautauqua County was established, with its present boundaries, from parts of Ontario and Genesee Counties. The territory originally was part of the domain of the Seneca Indians. In 1811, Chautauqua County established its own government and Mayville became the county seat.

At the time of settlement, much of the county was covered with white pine included in large stands of hardwoods. The first sawmill was built in 1805 on Conewango Creek in what is now the village of Kennedy. In 1806, James Prendergast founded a community that was first called The Rapids but later became known as Jamestown. In 1827, Jamestown, with its 395 inhabitants, was incorporated as a village. It was not until 1886 that Jamestown was incorporated as a city.

The growth of the furniture industry was a natural result of the development of a timber industry in the survey area, and for many years Jamestown has enjoyed a reputation as one of the top wood furniture manufacturing cities in the county. The wood furniture industry in Jamestown and Dunkirk now shares the spotlight with the manufacture of metal products.

Chautauqua County was named after its largest lake, which was called "Jad-dad-gwah" by the Seneca Indians. The lake is 20 miles long and is 1,308 feet above sea level, which makes it one of the highest navigable freshwater inland lakes in the United States. Chautauqua Lake has had a significant role in the history and development of the county. Tourism, which is the county's second largest industry, is stimulated by the picturesque quality of Chautauqua Lake and by the 40-mile-long shoreline of Lake Erie. The famous Chautauqua Institution, founded in 1874 and located on Chautauqua Lake, attracts thousands of people because of its educational and cultural programs. Another historic attraction in Chautauqua County is Lily Dale, located on Cassadaga Lake.

The part of Chautauqua County that is on lake plains is more densely settled than the part that is on plateaus. In 1880, the county population was 105,126, which represented an increase of 30,784 in 30 years. This increase was mainly a result of the growth of the cities of Jamestown and Dunkirk, but it was also to some extent a result of an inflow of people into the grape belt.

The largest city in the county is Jamestown, with a population of 35,775 *(8)*. It is at the southern end of Chautauqua Lake. Dunkirk, on Lake Erie, is the next largest city, with a population of 15,310. This city has a good harbor and facilities for water transportation. Silver Creek (population 3,088), Fredonia (population 11,126), Brocton (population 1,416), and Westfield (population 3,440) are locally important places in the lake region. The larger villages in the plateau region include Falconer (population 2,778), Lakewood (population 3,941), and Celeron (population 1,405). Mayville, with a population of 1,626, is at the northern end of Chautauqua Lake.

The two cities of Dunkirk and Jamestown reached their peak in the 1920's and 1930's, with populations of 19,336 and 45,155, respectively. According to the 1980 census, Chautauqua County had a population of 146,925, compared with 134,189 in 1950. The county's rural population has shown a slow but steady increase, while there has been a slight decline in the population of the major cities. The 1980 census reported 59,081

people, or 40 percent of the county total, living outside the population centers.

Chautauqua County was the birthplace of several important organizations. Fredonia Grange No. 1, established in 1868, was the first Grange in the world. Also, the first Women's Christian Temperance Association was organized in Fredonia. Education has been important since the county's early development. The Old Fredonia Academy opened in 1926 and was later replaced by the Fredonia Normal School. This school eventually became Fredonia State University, which is now part of the New York State University system.

Physiography and Geology

David S. Sullivan, geologist, Soil Conservation Service, helped prepare this section.

Chautauqua County is in two physiographic provinces: the Erie-Ontario Plain province and the Allegheny Plateau province. The Erie-Ontario Plain province is a lowland belt along the shores of Lake Erie. This belt is 2 to 6 miles wide and has topography typical of that of an abandoned lakebed. It has little relief except for a series of very narrow ravines cut across it by a number of streams. It ranges in elevation from 572 feet at Lake Erie to about 850 feet at the base of the bordering escarpment. The alignment of the escarpment parallels Lake Erie and ranges in elevation from 1,400 feet in the eastern part of the county to 1,600 feet in the western part.

The base of the escarpment constitutes the northern boundary of the Allegheny Plateau province, which occupies about 80 percent of the county. The plateau is characterized by steep valley walls, wide ridgetops, and flat-topped hills between drainageways. The part of the Allegheny Plateau in Chautauqua County is intersected by a number of broad, flat-bottomed valleys, presently occupied by sluggish, meandering streams. The topography is strongly influenced by the underlying bedrock, which is nearly level bedded.

On the Allegheny Plateau, the elevation rises from about 1,300 feet in the major valleys to 2,100 feet. The greater part of the upland portion of the plateau lies between elevations of 1,600 and 1,800 feet. The maximum elevation, 2,190 feet, occurs on Gurnsey Hill in the southeast corner of the county. This part of the county comprises the western margin of the unglaciated Salamanca reentrant *(6)*. This little corner of Chautauqua County (less than 2,000 acres) is the only part that was not covered by ice for at least part of the glacial period. Because it was never glaciated, this area has more rugged topography, has longer and steeper slopes, has deeply incised and V-shaped valleys, and does not have the irregular, hilly characteristics typical of much of the glaciated areas.

The geologic history of Chautauqua County dates back 300 million years to the Upper Devonian *(7)*. The various formations of rock, particularly those near Lake Erie, occur in bands that have an east-west orientation. They also possess very gentle regional dips that have a south-southeast orientation. The oldest rocks in Chautauqua County are largely the black and gray shales that occur along Lake Erie. The age of the rocks is progressively younger toward the southeastern part of the county.

The oldest bedrock formation in Chautauqua County is the Angola Shale *(7)*. The Angola Shale, which is part of the West Falls Group, consists of gray shale about 235 feet thick. It occurs in the extreme northeastern part of the county as a very thin band that starts just southwest of Irving and extends into Erie County.

The Angola Shale is overlain by the black Pipe Creek Shale. Although the Pipe Creek Shale is thin (about 2 feet thick), it can be easily recognized and traced. On the general geology map included in the back of this survey, the Angola Shale, the Pipe Creek Shale, and the overlying gray Hanover Shale are included as a single unit. The Hanover Shale occurs as a narrow band that extends in a northeasterly direction from just northeast of Dunkirk through the village of Silver Creek and into Erie County. The Hanover Shale, which is about 95 feet thick, is well exposed along the cliffs of Walnut and Silver Creeks. The Hanover Shale and the Pipe Creek Shale are within the Java Group *(7)*.

The Canadaway Group, which is a succession of black and gray shales that include some thin siltstone layers, occurs above the Java Group. In Chautauqua County, the Canadaway Group averages about 1,050 feet in thickness and is subdivided into seven members. The oldest of these is the black Dunkirk Shale, which is about 85 feet thick. This shale is exposed in the lake cliffs at Dunkirk. The exposure extends eastward along Walnut and Silver Creeks until it reaches a point south of the village of Silver Creek.

Overlying the Dunkirk Shale is a dominantly gray shale named South Wales Shale, which is about 50 feet thick. The South Wales exposures are along Lake Erie, west of Van Buren Point. They extend along Canadaway, Walnut, and Silver Creeks and then proceed eastward along Cattaraugus Creek. Above the South Wales Shale is the Gowanda Member, which consists of 280 feet of mainly gray shale that has thin bands of black shale and gray siltstone. This member is exposed along the shore of Lake Erie, between Barcelona and Brocton; along Canadaway Creek, near the village of Fredonia; along Walnut Creek, at Forestville; and along Silver Creek, south of the village

of Silver Creek. The Dunkirk, South Wales, and Gowanda Members are included as one unit on the general geology map.

The next member of the Canadaway Group is the Laona Member, which is made up of about 300 feet of gray siltstone. The most prominent exposures of this unit are along Canadaway Creek, near the settlement of Laona. Above the Laona Member is about 150 feet of mainly gray shale that includes thin beds of gray siltstone. This shale, called the Westfield Member, is best viewed in exposures near the village of Westfield, along the valley of Chautauqua Creek. The Laona and Westfield Members are included as one unit on the geology map. They occur as a narrow band that extends from the Pennsylvania State line, near Barcelona, in a northeasterly direction into Cattaraugus County, near Perrysburg.

The Shumla Member overlies the Westfield Member of the Canadaway Group. The Shumla Member is about 30 feet thick and consists of gray siltstone. Shumla siltstone exposures occur along Lake Erie, near the Pennsylvania State line, and extend eastward into the Chautauqua Creek Valley, near Westfield, and through Slippery Rock Creek to Canadaway Creek, at Shumla. The upper 470 feet of the Canadaway Group is represented by the Northeast Member, which consists of gray shale that includes some gray siltstone. The most prominent exposures of the Northeast Shale are along Chautauqua and Little Chautauqua Creeks, south of Westfield; along Canadaway Creek, east of Shumla; and along Walnut Creek, south of Forestville. The Shumla and Northeast Members are combined as one unit on the general geology map. This unit extends over a large portion of the northern and eastern parts of Chautauqua County.

The Conneaut Group, also referred to as the Chadakoin Formation, consists of two members and overlies the Canadaway Group. The lower 150 feet of the Conneaut Group is the Dexterville Member, which is composed of gray siltstone. The Dexterville Member can be observed in many parts of Chautauqua County. The unit was named after quarries located in the eastern part of the city of Jamestown, formerly known as Dexterville. The upper 270 feet of interbedded gray shale and siltstone of the Conneaut Group is known as the Ellicott Member. Because of the relatively soft shale within the Ellicott Member, the number of exposures within Chautauqua County is limited. The Dexterville and Ellicott Members are combined as one unit on the general geology map. These two units, the most extensive members, occur throughout the central and southeastern parts of Chautauqua County.

The Conewango Group was deposited at the close of the Devonian. This group, which is about 400 feet thick, is divided into the Venango and Oswayo Formations. The Venango Formation consists of about 300 feet of shale and siltstone and includes several beds of conglomerate about 30 feet thick. This formation is further subdivided into three members *(7)*. One member consists of about 30 feet of conglomerate and sandstone and is referred to as the Panama Conglomerate. This member has weathered into large blocks and formed "rock cities." An example is the Panama Rocks, located near the village of Panama. The Oswayo Formation overlies the Venango Formation and consists of about 100 feet of micaceous shale and siltstone. On the general geology map, the Venango and Oswayo Formations are included as one unit. The Venango Formation is mainly at the higher elevations in the southwestern and south-central parts of Chautauqua County. The Oswayo Formation is limited to the southeast corner of the county.

The youngest bedrock in Chautauqua County is called the Knapp Conglomerate *(7)*. This bedrock, which is concealed by soil and rock fragments, is limited to the caps of hills along the Chautauqua-Cattaraugus County line, about 0.5 mile north of the Pennsylvania State line.

Chautauqua County experienced several advances and retreats of glacial ice during the Pleistocene ice age. The ice age began about 300,000 years ago and ended during the late Wisconsin glaciation, about 14,000 years ago *(6)*. With each southern movement, the ice picked up soil material and pieces of bedrock and ultimately redeposited a mixture of unconsolidated material of varying size, shape, and mineral content. The last advance stripped earlier deposits and laid down the mantle in which most of the present-day soils formed.

As the climate warmed and the melting of the ice overcame the glacial advance, the glacier began to recede. The first areas to be exposed were the uplands, where the ice was thinnest. Because the deposited material was quite variable, different soils formed in it. The mixture of rock fragments and finer particles deposited by the ice in these upland areas is called glacial till. The thickness of this till is quite variable and can range from a few feet on some hilltops to more than 10 feet below the higher ridges. Some examples of soils that formed in deep glacial till are those of the Erie, Busti, and Schuyler series. The soils of the Orpark, Hornell, and Towerville series are examples of soils that formed in glacial till only 20 to 40 inches thick over bedrock.

As the glacial ice melted and receded, further exposing valley areas, large quantities of meltwater discharging from the glacial front carried rock and soil debris, which was deposited as valley train terraces,

kames, and eskers. Nearly level or undulating valley train terrace deposits occupy the floor of many valleys. All of these postglacial fluvial deposits generally are referred to as outwash or glaciofluvial deposits and consist mainly of stratified sand and gravel. Chenango and Red Hook soils are examples of soils that formed in these deposits.

The remnants of the last advance of the glacier in Chautauqua County, which occurred about 12,000 years ago, are referred to as the Lake Escarpment Moraines *(6)*. These moraines exhibit strong topographic expression and are characterized by conspicuous kame knobs and kettles. As the glacier continued to retreat northward, meltwater was trapped between these moraines and the ice front. Consequently, glacial lakes were formed. The glacial lakes occupied the northern part of the county for long periods. Fine soil particles carried in suspension by the meltwater settled to the bottom of these glacial lakes. Glaciolacustrine deposits such as these are on the floor and lower side slopes of the valleys. Niagara and Canandaigua soils, which are free of stones, are examples of soils that formed in these deposits.

A striking topographic feature called the Beach Ridge is parallel to Lake Erie and runs across the county. This feature represents the shore line of the former glacial lake, which developed during many years of wave action and erosion. The gravel beaches that formed along the shores of ancient glacial lakes produced the well drained Chenango soils, which are excellent soils on which to establish vineyards and orchards.

Erosion and sedimentation have been taking place continually since the ice retreated. Steep, fan-shaped alluvial deposits have accumulated at the mouth of lateral streams, where the velocity of the water slowed and the sand and gravel dropped out of suspension. Chenango and Pompton soils formed in these deltaic deposits. Silty alluvial sediment from flood-prone streams are examples of the more recent deposits that are not related to glaciation. Tioga and Middlebury soils formed in recent alluvial deposits on flood plains.

A cross-sectional representation relating selected soils in Chautauqua County and their parent materials, which include glacial till, outwash, lacustrine material, and sand, is shown in figure 2.

Drainage

The drainage of Chautauqua County is separated into two systems: the Allegheny-Ohio-Mississippi River system and the Lake Erie-St. Lawrence River system. The drainage from the plateau region flows southward into the Allegheny-Ohio-Mississippi River system, and that from the escarpment along the northwestern part of the county drains to the north into the Lake Erie-St. Lawrence River system.

In the eastern two-thirds of the county, the principal drainage system for the upland plateau is Conewango Creek and its tributaries. Conewango Creek rises in East and West Mud Lakes and flows southward through a broad, flat valley 1.5 to 3.0 miles wide. The creek leaves the county at a point east of Ellington, but it returns at Waterboro. It then proceeds through a narrow, gorgelike valley to Kennedy and on into Pennsylvania, where it enters a broad, flat valley. Cassadaga Creek, which is an outlet for Cassadaga Lake, is joined by the outlet for Bear Lake at a point about 4 miles south of Stockton. It takes a southeasterly course and empties into Conewango Creek at a point 3 miles south of Levant. For most of their length, Conewango and Cassadaga Creeks have a fall of less than 2 feet per mile. These low gradients cause both of the creeks to meander back and forth across the valley floor.

The Chautauqua Lake Valley contains the lake itself and several main tributaries. Prendergast, Ball, and Goose Creeks flow northwest into Chautauqua Lake, and Big Inlet, Dewittville, and Bemus Creeks flow south into the lake. The lake is very shallow and flat bottomed, especially in the southern half. The Chadakoin River is the outlet for Chautauqua Lake. It flows through the city of Jamestown and the village of Falconer and then empties into Cassadaga Creek at a point south of Frewsburg.

Most of the drainage in the southwestern part of the county is through French Creek, which originates near Sherman and flows southwest into Pennsylvania. Brownell and Brokenstraw Creeks, in the south-central part of the county, flow south into Pennsylvania.

The drainage of the northern slope of the escarpment and lake plain flows north into Lake Erie through numerous small waterways and several major creeks. Twenty Mile Creek drains the northwestern part of the county, and the drainage flows into Lake Erie. Chautauqua Creek flows north through Westfield and on to the lake. Canadaway Creek flows north through the village of Fredonia and the city of Dunkirk, and Walnut Creek flows north and is joined by Silver Creek before entering Lake Erie.

Water Supply

The main sources of water in Chautauqua County are Lake Erie, Chautauqua Lake, drilled wells, and surface water stored in reservoirs *(3)*.

There are 17 public water systems in the county. The largest system is that for Jamestown, which serves the urban and suburban areas of Celeron and Falconer as

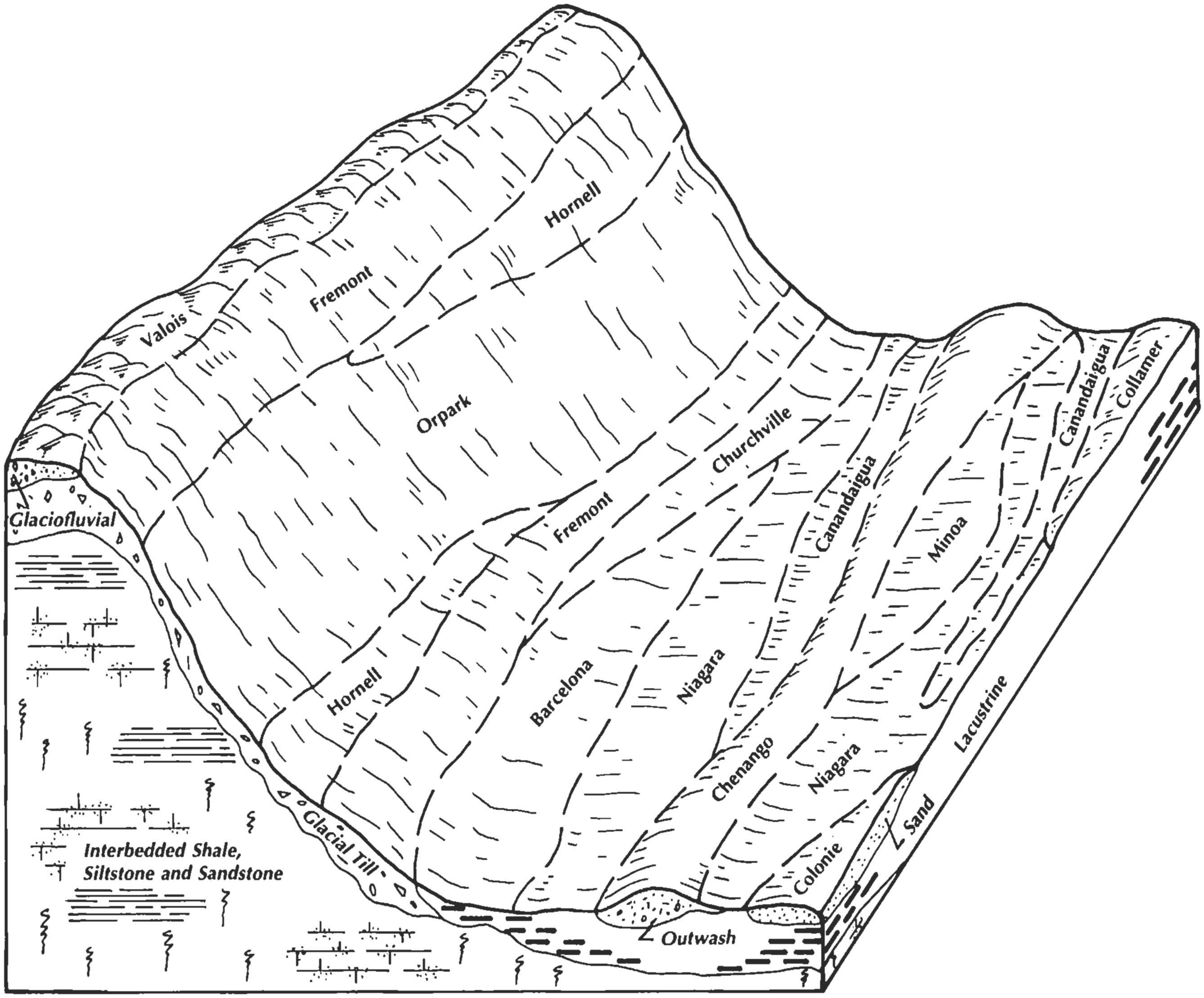

Figure 2.—Soils and parent material on a bedrock escarpment and on a lake plain that includes the Beach Ridge.

well as West Ellicott and some of Lakewood. It draws all of its water from two well fields, one in the town of Ellicott and the other in the town of Poland.

Dunkirk has the second largest water system in the county. It is the only community that draws its water from Lake Erie. Chautauqua Institution is the only system to use Chautauqua Lake as a source of water. There are five water systems that use surface runoff water stored in upland reservoirs. These systems include those for Brocton, Fredonia, Ripley, Silver Creek, and Westfield. Ripley draws water from Belson Creek for storage, and Westfield draws water from Chautauqua Creek as well as from an upland reservoir. Forestville is the only community to get its water exclusively from a spring, and Cherry Creek uses a combination of wells and a spring. The rest of the public water systems use drilled wells as a source of water.

Water for rural areas and for other developments is obtained largely from drilled wells. Although ground water is available everywhere in the area, wells on the lake plain and bedrock wells generally provide lower yields and a poorer quality of water. The most productive water-bearing deposits are those that are in aquifers consisting of unconsolidated deposits derived from glacial outwash and from deltaic deposits of sand and gravel.

Transportation Facilities

Chautauqua County is served by two railroad systems. Both railroads have lines that run along the lake plain in a general northeast-to-southwest direction, parallel to Lake Erie. One of the railroads also has a line that enters the county in the vicinity of Kennedy, runs through the Jamestown area, and then runs south into Pennsylvania.

The main highways along the lake plain are Interstate 90, New York Route 5, and U.S. Route 20. These highways are all within 5 miles of Lake Erie and are generally parallel to one another. The Southern Tier Expressway is the main highway running from east to west in the southern part of the county. New York Route 394 enters Chautauqua County at Waterboro and continues eastward through Jamestown, runs along the western side of Chautauqua Lake, and connects with New York Route 5 at Barcelona. New York Route 430 originates at the Jamestown city limit, runs along the eastern side of the lake to Mayville, and then goes southwest to Sherman and Findley Lake. New York Route 426 and New York Route 76 are the two highways that run from north to south in the western part of the county. New York Route 60 is the main highway running from north to south that connects Jamestown with Dunkirk and Interstate 90. U.S. Route 62 runs from north to south in the southeastern part of the county.

Commercial airline service is available at the Chautauqua County Airport, just north of Jamestown. Commercial airline service also is available at Buffalo and New York City and at Erie, Pennsylvania.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Jamestown, New York, in the period 1951 to 1960. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 29 degrees F and the average daily minimum temperature is 21 degrees. The lowest temperature on record, which occurred at Jamestown on January 15, 1957, is -11 degrees. In summer, the average temperature is 69 degrees and the average daily maximum temperature is 81 degrees. The highest recorded temperature, which occurred at Jamestown on September 2, 1953, is 98 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 39 inches. Of this, 20 inches, or about 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 4.25 inches at Jamestown on January 16, 1954. Thunderstorms occur on about 30 days each year.

The average seasonal snowfall is about 101 inches. The greatest snow depth at any one time during the period of record was 30 inches. On the average, 79 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 65 percent of the time possible in summer and 25 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 14 miles per hour, in winter.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material has few or no roots or other living organisms and has been changed very little by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to

predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the survey area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy only small areas and therefore cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way

diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map of Chautauqua County joins with those of adjacent counties having published soil surveys, which are identified in the following paragraphs.

Warren County, Pennsylvania.—Except for differences in the design of the legend for the detailed map units that include soils that formed in glacial till and are along the border with Warren County, the general soil maps of Warren and Chautauqua Counties can be joined. In all cases, delineations separating general soil map units in areas of glacial till from those in areas of glacial outwash and alluvium join across the survey boundary.

Erie County, Pennsylvania.—In general, the Chautauqua County general soil map joins with that of Erie County except in two areas. One of these areas is map unit 10, which is in upland areas of Erie County. This area should be terminated short of the county line that is shared with Chautauqua County, where map unit 4 dominates. Erie and Langford soils are shown on both sides of the State line. The other area, map unit 4 in Erie County, is along the southern boundary with Chautauqua County. This area should be terminated before reaching the county line because the detailed soil map units on both sides of the county line do not include the soils named in general soil map unit 4. It is expected that in both cases the map unit boundaries in Erie County were extended to the county line as a matter of convenience. Other areas are joined with similar soils, except where some series concepts and names differ as a result of changes in classification made since the Erie County report was published in 1960.

Cattaraugus County, New York.—This county does not have a modern published soil survey and general soil map. A survey is currently in progress. The published soil survey of the Seneca Nation of Indians does not contain a general soil map.

The general soil map units in this survey have been grouped into general kinds of landscape for broad interpretive purposes. Each of the broad groups and the map units in each group are described in the following pages.

Map Unit Descriptions

Areas Dominated by Very Deep Soils That Do Not Have a Fragipan and That Formed in Glacial Till

These soils make up about 56 percent of the county. They are on uplands and valley sides. They are dominantly very deep, well drained to somewhat poorly drained, and nearly level to very steep.

1. Busti-Chautauqua-Chadakoin

Dominantly nearly level to very steep, very deep, somewhat poorly drained to well drained, medium textured soils; on uplands

This map unit consists of soils that formed in loamy glacial till derived mainly from siltstone, sandstone, and some shale. The landscape consists dominantly of broad, smooth areas on hilltops and hillsides and some dissected side slopes on the upland plateau in the central part of the county. Slopes are mainly 3 to 15 percent but range from 0 to 50 percent.

This unit makes up about 34 percent of the county. Busti soils make up about 45 percent of the unit;

Chautauqua soils, 30 percent; Chadakoin soils, 10 percent; and soils of minor extent, 15 percent.

The Busti soils are somewhat poorly drained and are dominantly medium textured. They are nearly level to sloping. They are in undulating areas, on the lower side slopes, and along drainageways that commonly receive runoff from the higher adjacent soils, or they are in areas on flats where runoff is slow. The rate of water movement is moderately slow or moderate in the surface layer and subsoil and slow or moderately slow in the substratum. A perched water table is in the upper part of the subsoil from late in fall through spring.

The Chautauqua soils are moderately well drained, medium textured, and nearly level to moderately steep. They are on convex hilltops and side slopes that receive little runoff from the adjacent soils. The rate of water movement is moderate in the surface layer and subsoil and moderately slow in the substratum. A perched water table is in the lower part of the subsoil from late in fall through spring.

The Chadakoin soils are well drained, medium textured, and gently sloping to very steep. They are on convex hilltops, hillsides, and valley sides that are strongly dissected by intermittent streams. The rate of water movement is moderate throughout the profile. The seasonal high water table is at a depth of more than 3 feet.

The soils of minor extent include Ashville, Alden, Fremont, Orpark, Red Hook, Valois, Dalton, Erie, Holderton, and Wayland soils. The very poorly drained Alden soils are in depressional areas and on low flats. The poorly drained Ashville soils are on low flats and along drainageways. The somewhat poorly drained Fremont soils are in many upland areas. They have a higher content of clay in the subsoil than the Busti soils. The well drained Valois soils and the somewhat poorly drained Red Hook soils are in areas of gravelly glacial outwash. The somewhat poorly drained Dalton and Erie soils are on uplands. They have a fragipan. The somewhat poorly drained Holderton and Wayland soils are along the narrow drainageways that drain some areas of the unit.

Most areas of this unit have been cleared and are farmed. Scattered areas of the wetter soils and the steep soils on side slopes remain wooded or are idle land covered with brush. Many areas at the higher elevations and along escarpments were cleared for farming but now are idle land or have reverted to woodland. The major soils are better suited to corn, small grain, and hay than many of the other soils in the county. Stripcropping is common. Erosion control and supplemental drainage of the wetter areas are the main management needs in cultivated areas. The seasonal high water table and the moderately slow movement of water in the substratum are the main limitations affecting community development.

2. Fremont-Schuyler

Dominantly nearly level to very steep, very deep, somewhat poorly drained and moderately well drained, medium textured to moderately fine textured soils that have a low content of lime; on uplands

This map unit consists of soils that formed in acid glacial till derived mainly from shale, siltstone, and some sandstone. The landscape is dominantly broad summits and saddles and dissected side slopes on plateaus. The unit is mainly in the southern part of the county. It is adjacent to the escarpment in the northern part. Slopes are mainly 3 to 15 percent but range from 0 to 50 percent.

This unit makes up about 22 percent of the county. Fremont soils make up about 60 percent of the unit; Schuyler soils, 20 percent; and soils of minor extent, 20 percent.

The Fremont soils are somewhat poorly drained and are nearly level to moderately steep. They are on broad upland flats, in saddles, and on side slopes. The subsoil and substratum are medium textured and moderately fine textured. The rate of water movement is moderate or moderately slow in the subsoil and slow or very slow in the substratum. A perched seasonal high water table is in the upper part of the subsoil in winter and spring.

The Schuyler soils are moderately well drained and are gently sloping to very steep. They are in convex areas on the summits and dissected side slopes of the plateau. The subsoil and substratum are medium textured to moderately fine textured. The rate of water movement is moderate or moderately slow in the subsoil and slow in the substratum. A perched seasonal high water table is in the lower part of the subsoil early in spring.

The soils of minor extent include Towerville, Orpark, Ashville, Busti, Chautauqua, Canaseraga, Mardin, Volusia, and Valois soils. The moderately well drained Towerville soils and the somewhat poorly drained Orpark soils are the most extensive of the minor soils. They are in many areas where shale bedrock is at a depth of 20 to 40 inches. The poorly drained Ashville soils are on low flats or along drainageways. The somewhat poorly drained Busti soils and the moderately well drained Chautauqua soils have less clay in the subsoil than the major soils. The moderately well drained Canaseraga and Mardin soils and the somewhat poorly drained Volusia soils are in upland areas and have a dense fragipan in the subsoil. The

Figure 3.—A typical area of the Erie-Langford general soil map unit. Langford soils are on the ridges in the background, and Erie soils are in the foreground.

well drained Valois soils occur only in a few areas, mainly on the lower side slopes of valleys.

Most areas of this unit are used for crops grown in support of dairy farming. Many areas at the higher elevations were originally cleared and farmed. These areas have been reforested or are naturally reverting to woodland. The difficulty of controlling erosion and installing drainage systems is the main limitation affecting farming. The seasonal wetness, the slope, and the slow or very slow movement of water in the substratum are the main limitations affecting community development.

Areas Dominated by Very Deep Soils That Have a Fragipan and That Formed in Glacial Till

These soils make up about 6 percent of the county. They are on uplands and valley sides. They are dominantly very deep, moderately well drained to somewhat poorly drained, and nearly level to moderately steep.

3. Erie-Langford

Dominantly nearly level to moderately steep, very deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan and a medium content of lime; on uplands

This map unit consists of soils that formed in loamy glacial till derived from siltstone, sandstone, shale, and some limestone. The landscape dominantly consists of broad, divided hilltops and hillsides on the upland plateau in the north-central part of the county. Some areas have distinct drumlins (fig. 3). Slopes are mainly 3 to 8 percent but range from 0 to 15 percent.

This unit makes up about 7 percent of the county. Erie soils make up about 30 percent of the unit; Langford soils, 20 percent; and soils of minor extent, 50 percent.

The Erie soils are somewhat poorly drained, nearly level to sloping, and dominantly medium textured. They are on concave foot slopes, on the lower hillsides, and in broad divides. Some areas are along drainageways that commonly receive runoff from the higher adjacent slopes, and some are on flats where surface water is removed slowly. The rate of water movement is moderate in the surface layer and the upper part of the subsoil and slow in the fragipan and substratum. The fragipan is at a depth of 10 to 16 inches. It restricts root growth and forms a perched seasonal high water table in the upper part of the subsoil in spring and during other excessively wet periods.

The Langford soils are moderately well drained, gently sloping to moderately steep, and dominantly medium textured. They are in convex areas on hilltops, in divides, and on ridges, low knolls, and hillsides. The rate of water movement is moderate in the surface layer and the upper part of the subsoil and slow in the fragipan and substratum. The fragipan is at a depth of 14 to 26 inches. It restricts root growth and forms a perched seasonal high water table in the subsoil for brief periods in spring and during other excessively wet periods.

The soils of minor extent include Alden, Ashville, Busti, Chautauqua, Orpark, Darien, Schuyler, Fremont, Dalton, and Chadakoin soils. The very poorly drained Alden soils are in depressional areas and on low flats. The poorly drained Ashville soils are on low flats and along drainageways. The somewhat poorly drained Fremont soils and the moderately well drained Schuyler soils are on uplands and have a higher content of clay in the subsoil than the major soils. The somewhat poorly drained Busti soils and the moderately well drained Chautauqua soils are on the lower side slopes. They do not have a fragipan. Orpark soils are somewhat poorly drained and have shale bedrock at a depth of 20 to 40 inches. Dalton soils are in positions in the uplands similar to those of the major soils. They have a distinct silt cap overlying a dense fragipan. The somewhat poorly drained Darien soils do not have a firm fragipan. They are in broad, undulating areas. The well drained Chadakoin soils are on the steeper dissected side slopes.

Most of the cleared areas are used for crops grown in support of dairy farming. Providing drainage and controlling erosion are the main management needs if crops are grown. Interceptor drains are needed to divert runoff and subsurface seepage in many areas. The seasonal wetness and the slow movement of water in the fragipan are the main limitations affecting community development.

4. Volusia-Mardin

Dominantly nearly level to moderately steep, very deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan and a low content of lime; on uplands

This map unit consists of soils that formed in loamy glacial till derived from siltstone, sandstone, and shale. The landscape dominantly consists of broad till plain divides and the lower side slopes of the upland plateau that is dominantly in the southeastern part of the county. Slopes are mainly 3 to 8 percent but range from 0 to 15 percent.

This unit makes up about 3 percent of the county. Volusia soils make up about 60 percent of the unit; Mardin soils, 15 percent; and soils of minor extent, 25 percent.

The Volusia soils are somewhat poorly drained and are dominantly medium textured. They are nearly level to moderately steep. They are mainly on the lower hillsides and concave foot slopes that receive runoff from the higher adjacent soils. Some areas are on the tops of broad, smooth divides where runoff is slow. The rate of water movement is moderate in the surface layer and the upper part of the subsoil and very slow in the fragipan and substratum. The fragipan is at a depth of 10 to 16 inches. It restricts root growth and forms a perched seasonal high water table in the upper part of the subsoil in spring and during other excessively wet periods.

The Mardin soils are moderately well drained and are dominantly medium textured. They are gently sloping to moderately steep. They are in slightly concave areas on hilltops, knolls, ridges, and hillsides. The rate of water movement is moderate in the surface layer and the upper part of the subsoil and slow or very slow in the fragipan and substratum. The dense fragipan is at a depth of 14 to 26 inches. It restricts root growth and forms a perched seasonal high water table for brief periods in spring.

The soils of minor extent include Ashville, Towerville, Fremont, Chadakoin, Busti, and Valois soils. The poorly drained Ashville soils are on concave toe slopes, in seepage areas, and in depressional areas. The somewhat poorly drained Fremont soils are on summits of plateaus. They do not have a firm fragipan. The moderately well drained Towerville soils occur in a few areas where the depth to bedrock is 20 to 40 inches. The somewhat poorly drained Busti soils are along the

lower toe slopes. They do not have a firm fragipan. The well drained Valois soils are on some ridges and knolls on the lower valley sides.

Cleared areas of this unit are used for crops grown in support of dairy farming. Many areas that were cleared for farming are now idle or are reverting to woodland. Controlling erosion and providing drainage are the main management needs if crops are grown. Interceptor drains are needed to divert runoff and subsurface seepage in many areas. The seasonal wetness and the slow or very slow movement of water in the fragipan are the main limitations affecting community development.

Areas Dominated by Moderately Deep Soils Formed in Glacial Till

These soils make up about 4 percent of the county. They formed mainly in glacial till less than 40 inches deep over siltstone or shale bedrock. In some places the bedrock is exposed. In most areas the soils are nearly level to moderately steep, but in some areas along valley sides and on escarpment faces they are steep or very steep. The soils are dominantly somewhat poorly drained.

5. Hornell-Orpark

Dominantly nearly level to moderately steep, moderately deep, somewhat poorly drained, moderately fine textured soils that have a low content of lime; on uplands

This map unit consists of soils that formed in acid, shaly glacial till derived from siltstone and shale. The landscape is one of crests and side slopes on uplands along the escarpment in the northwestern part of the county. The escarpment is parallel to Lake Erie. Slopes are mainly 3 to 15 percent but range from 0 to 25 percent.

This unit makes up about 4 percent of the county. Hornell soils make up about 45 percent of the unit; Orpark soils, 35 percent; and soils of minor extent, 20 percent.

The Hornell soils formed in moderately deep glacial till that has a high content of clay. They are 20 to 40 inches deep over bedrock and are nearly level to moderately steep. They are in convex areas on hilltops and summits and on valley sides. The rate of water movement is slow in the subsoil. A perched seasonal high water table is in the upper part of the subsoil in winter and spring.

The Orpark soils are 20 to 40 inches deep over bedrock. They formed in moderately deep glacial till. They are nearly level to moderately steep and are on hilltops, summits, and hillsides. The rate of water movement is slow or moderately slow in the subsoil. A perched seasonal high water table is in the upper part of the subsoil from fall through spring.

The soils of minor extent include Towerville, Fremont, Schuyler, Ashville, and Busti soils. The poorly drained Ashville soils are on low flats and along drainageways. The somewhat poorly drained Busti soils are very deep over bedrock and have less clay in the subsoil than the major soils. Fremont and Schuyler soils are very deep over bedrock. Towerville soils are moderately well drained and contain less clay in the subsoil than the Hornell soils.

Some areas of this unit are farmed, but extensive areas are idle or are reverting to woodland. Most cleared areas are used for hay or pasture, but some are used for orchards or vineyards. Gullies and stream entrenchments are common along the side slopes of the escarpment. Providing drainage and controlling erosion are the main management needs if crops are grown. The soils dry out slowly in spring, and they are sticky when wet. The seasonal wetness, the slope, the depth to bedrock, and the restricted movement of water in the subsoil are the main limitations affecting community development.

Areas Dominated by Deep and Very Deep Soils Formed in Glacial Lake Sediments

These soils make up about 12.7 percent of the county. They formed in clayey, silty, and sandy lake-laid deposits that generally have no coarse fragments. They are mainly on lowland lake plains in the northwestern part of the county and in the major valleys that dissect the upland plateau in the central and southern parts. In most areas the soils are nearly level and gently sloping and are somewhat poorly drained to very poorly drained.

6. Niagara-Canandaigua-Minoa

Dominantly nearly level and gently sloping, very deep, somewhat poorly drained and poorly drained, moderately fine textured and medium textured soils that have a medium content of lime; on lowland lake plains

This map unit consists of soils that formed in glacial lake-laid deposits. The landscape is a broad, nearly flat plain that is traversed by numerous streams and drainageways. The unit is in the northwestern part of the county, on the lowlands parallel to Lake Erie. Slopes are mainly 0 to 3 percent but range from 0 to 8 percent.

This unit makes up about 5.7 percent of the county. Niagara soils make up about 50 percent of the unit; Canandaigua soils, 25 percent; Minoa soils, 10 percent; and soils of minor extent, 15 percent.

The Niagara soils formed in very deep lake-laid deposits that are dominantly silt. They are moderately fine textured and medium textured and are somewhat poorly drained. They are nearly level and gently sloping and are on broad flats in low, undulating areas on the lake plains. They have very few or no gravel fragments. The rate of water movement is moderately slow in the subsoil and substratum. An apparent seasonal high water table is in the upper part of the subsoil in winter and spring.

The Canandaigua soils formed in very deep lake-laid deposits that are dominantly silt. They are moderately fine textured and medium textured, poorly drained, and nearly level. They are in the lower depressional areas on the lake plains. The rate of water movement is moderately slow in the subsoil and substratum. An apparent seasonal high water table is at or near the surface for prolonged periods from fall through spring.

The Minoa soils formed in very deep lake-laid deposits that are dominantly very fine sand. They are medium textured and somewhat poorly drained. They are in relatively flat areas on the lake plains. They generally have no coarse fragments. The rate of water movement is moderate in the subsoil and moderate or moderately rapid in the substratum. An apparent seasonal high water table is in the upper part of the subsoil in winter and spring.

The soils of minor extent include Raynham, Lamson, Collamer, Colonie, Elnora, Rhinebeck, and Canadice soils. The somewhat poorly drained Raynham soils are dominantly high in content of silt and contain less clay in the subsoil than the Niagara soils. The poorly drained Lamson soils are dominantly very fine sand. The well drained Colonie soils and the moderately well drained Elnora soils are sandy. They are on the higher knolls on the lake plains. The moderately well drained Collamer soils are similar to the Niagara soils. They are on the slightly higher knolls. The somewhat poorly drained Rhinebeck soils and the poorly drained Canadice soils have a higher content of clay in the subsoil than any of the other soils in the unit.

Most areas of this unit have been cleared of trees and are farmed. Most areas are used for vineyards, orchards, or vegetables. Some areas are used for general farming. Some are idle land that is reverting to shrubs. The major soils can be easily cultivated. When properly drained, they respond well to good management. Seasonal or prolonged wetness is the main limitation affecting most uses. Excavations and cuts that extend into the substratum are subject to slumping, sloughing, or piping. Areas along ditchbanks and in other excavations are highly erodible.

7. Barcelona-Rhinebeck

Dominantly nearly level and gently sloping, deep and very deep, somewhat poorly drained, moderately fine textured and fine textured soils that have a medium content of lime; on lowland lake plains

This map unit consists of soils that formed in clayey and silty glacial lake-laid deposits. The landscape is a broad, nearly flat plain that is traversed by numerous streams and drainageways. The unit is on the glacial lake plain in the northeastern part of the county. Slopes are mainly 0 to 3 percent but range from 0 to 8 percent.

This unit makes up about 2 percent of the county. Barcelona soils make up about 75 percent of the unit; Rhinebeck soils, 10 percent; and soils of minor extent, 15 percent.

The Barcelona soils formed in deep, silty lake-laid deposits and the underlying glacial till. They are moderately fine textured. They are on broad flats on the lake plain and have bedrock at a depth of 40 to 60 inches. The surface layer and the upper part of the subsoil generally do not have coarse fragments. The rate of water movement is moderately slow in the subsoil and moderately slow or moderate in the substratum. An apparent seasonal high water table is in the upper part of the subsoil in winter and spring.

The Rhinebeck soils formed in very deep lake-laid deposits of clay and silt. They are fine textured and are nearly level. They are on broad flats on the lake plains. They have a perched seasonal high water table in the upper part of the subsoil in winter and spring.

The soils of minor extent include Canadice, Churchville, Niagara, Canandaigua, and Orpark soils. The somewhat poorly drained Churchville soils are high in content of clay and are very deep over bedrock. The somewhat poorly drained, silty Niagara soils also are very deep over bedrock. The poorly drained Canandaigua and Canadice soils are very deep over bedrock and are in slightly depressional areas on the lake plains. The somewhat poorly drained Orpark soils are at the edge of areas where bedrock is at a depth of 20 to 40 inches.

Most areas of this unit have been cleared and are used for general farming, vineyards, orchards, or vegetables. Some areas are still being farmed, but many fields are now idle or support brush. The soils are very sticky when wet and are cloddy when dry. The seasonal wetness, the restricted movement of water in the subsoil, and clayey textures are the main limitations affecting most uses. The restricted depth to bedrock also is a limitation affecting community development.

8. Raynham-Canandaigua-Getzville

Dominantly nearly level and gently sloping, very deep, somewhat poorly drained to very poorly drained, medium textured soils that have a medium content of lime; on broad flats in valleys

This map unit consists of soils that formed in glacial lake-laid deposits and in older alluvial deposits. The landscape is that of broad lowland valley floors traversed by sluggish, meandering streams. The unit is in the major valleys in the central and southern parts of the county. Slopes are mainly 0 to 3 percent but range from 0 to 8 percent.

This unit makes up about 5 percent of the county. Raynham soils make up about 25 percent of the unit; Canandaigua soils, 15 percent; Getzville soils, 15 percent; and soils of minor extent, 45 percent.

The Raynham soils formed in very deep lake-laid deposits that are dominantly silt and very fine sand. They are medium textured, somewhat poorly drained, and nearly level and gently sloping. They are on broad flats on valley floors. They generally do not have coarse fragments. The rate of water movement is moderate in the subsoil and moderately slow or slow in the substratum. An apparent seasonal high water table is in the upper part of the subsoil from fall through spring.

The Canandaigua soils formed in very deep lake-laid deposits that are dominantly silt. They are medium textured and moderately fine textured, very poorly drained, and nearly level. They have a surface layer that is enriched with humus. They are in the lower depressional areas on valley floors, commonly in slack-water areas. They do not have coarse fragments. The rate of water movement is moderately slow in the subsoil and substratum. An apparent seasonal high water table is at or near the surface for prolonged periods from fall through spring, and some areas are ponded during these periods.

The Getzville soils formed in a thin mantle of silty material over lake-laid sandy sediment. They are poorly drained and very poorly drained and are nearly level. They commonly are in depressional and slack-water areas in the major valleys. The rate of water movement is moderate or moderately slow in the silty subsoil and moderately rapid in the sandy substratum. An apparent seasonal high water table is at or near the surface for prolonged periods from fall to late in spring.

The soils of minor extent include Swormville, Lamson, Halsey, Red Hook, Canadice, Pompton, Wayland, Teel, Scio, Minoa, and Henrietta soils. The somewhat poorly drained Swormville soils have a mantle of silty material underlain by sandy sediment. The somewhat poorly drained Minoa soils, the poorly drained Red Hook soils, and the poorly drained and very poorly drained Halsey soils formed in outwash. The poorly drained Canadice soils have a higher content of clay in the subsoil and substratum than the major soils. The moderately well drained Teel soils and the poorly drained and very poorly drained Wayland soils formed in recent alluvium. The moderately well drained Scio soils are silty throughout. The very poorly drained Henrietta soils have a thin layer of organic matter that is underlain by sandy sediment.

Most areas of this unit have been cleared and are used for farming. The remaining areas are woodland or are idle land that supports brush. The soils in these areas are mainly those that are more poorly drained. Many areas are still used for crops grown in support of dairy farming. If properly drained, most areas of this unit are easy to cultivate and respond well to good management. The seasonal or prolonged wetness is the main limitation affecting most uses. Excavations and cuts that extend into the substratum are subject to slumping, sloughing, or piping. Many areas of this unit should remain wooded and be developed for wildlife habitat.

Areas Dominated by Very Deep Soils Formed in Glacial Till and Glacial Outwash

These soils make up about 8 percent of the county. They formed in morainic glacial till and gravelly outwash. They are moderately well drained to somewhat excessively drained. They are on beach ridges and outwash plains in the northern lake plain area of the county and on valley terraces, outwash fans, and outwash plains in the southern part. The soils generally are nearly level to rolling, except along terrace fronts and in dissected hilly areas, where they range to very steep.

9. Valois-Chenango-Pompton

Dominantly nearly level to very steep, very deep, moderately well drained to somewhat excessively drained, medium textured and moderately coarse textured soils that have a low content of lime; on outwash plains and in valleys

This map unit consists of soils that formed in morainic glacial till and gravelly outwash. The landscape is made up of rolling plains and a series of low hills, benches, stream terraces, and alluvial fans that are mainly on the lower valley sides. The unit is in the major valleys throughout the county and on outwash plains of the northern lake plain. Slopes are mainly 3 to 15 percent but range from 0 to 50 percent.

This unit makes up about 8 percent of the county. Valois soils make up about 40 percent of the unit;

Chenango soils, 30 percent; Pompton soils, 10 percent; and soils of minor extent, 20 percent.

The Valois soils formed in very deep glacial till that is derived from sandstone, siltstone, and shale and commonly is intricately intermingled with or underlain by gravelly glacial outwash. These soils are medium textured and moderately coarse textured, well drained, and gently sloping to very steep. They are on low knolls, ridges, and hills on the lower valley sides and valley floors. The rate of water movement is moderate in the subsoil and moderate or moderately rapid in the substratum. The seasonal high water table is at a depth of more than 3 feet.

The Chenango soils formed in glacial outwash that has a high content of sand and gravel. They are well drained or somewhat excessively drained and have a medium textured or moderately coarse textured subsoil. The substratum is coarse textured and commonly is stratified. These soils are nearly level to sloping in areas where they occur on beach ridges, outwash plains, terrace tops, and alluvial fans on valley floors, and they are moderately steep or steep in areas where they occur on the sides of terraces. The rate of water movement is moderate or moderately rapid in the subsoil and rapid in the substratum. The water table usually is at a depth of more than 6 feet.

The Pompton soils formed in glacial outwash consisting dominantly of sandstone and siltstone fragments. They are moderately well drained, have a medium textured subsoil and a moderately coarse textured substratum, and are nearly level. They are on broad terraces on valley floors and commonly are slightly lower on the landscape than the adjacent, better drained Chenango soils. The rate of water movement is moderate or moderately rapid in the subsoil and rapid in the substratum. A seasonal high water table is in the upper part of the subsoil from late in fall through spring.

The soils of minor extent include Red Hook, Halsey, Tioga, Middlebury, Colonie, Collamer, Scio, Unadilla, Allard, and Chautauqua soils. The somewhat poorly drained Red Hook soils and the very poorly drained Halsey soils formed in similar outwash deposits and are on the lower flats on valley floors. The well drained Tioga soils and the moderately well drained Middlebury soils are on alluvial flood plains adjacent to the major streams. The well drained to excessively drained Colonie soils formed in lake-laid deposits of fine sand. The moderately well drained Collamer soils formed in lake-laid deposits of silt and clay. The well drained Unadilla and Allard soils have a mantle of silty material. The moderately well drained Chautauqua soils formed in glacial till.

Most areas of this unit have been cleared and are used for farming. The less sloping areas of the major soils are excellent sites for farming. They readily dry out early in spring and are easy to cultivate. Specialty crops, such as snap beans and strawberries, are produced along with corn, small grain, and alfalfa grown in support of dairy farming. Many areas along the lake plain are used for orchards, vineyards, or vegetables. Droughtiness is a management concern in some years, particularly in areas of the gravelly Chenango soils. Generally, the better drained outwash soils provide good sites for most uses and are suitable sources of sand and gravel. The slope, the seasonal wetness, and the high content of gravel are the main limitations affecting most uses.

Areas Dominated by Very Deep Soils Formed in Glacial Outwash, Glaciolacustrine Material, and Recent Alluvium

These soils make up about 8 percent of the county. They formed in glacial outwash, silty lake-laid deposits, and recent alluvium. They are mainly in the major valleys that dissect the upland plateau in the central and southern parts of the county. In most areas the soils are nearly level and gently sloping. They are somewhat excessively drained to very poorly drained.

10. Chenango-Wayland-Swormville

Dominantly nearly level and gently sloping, very deep, very poorly drained to somewhat excessively drained soils; on glacial outwash fans, on alluvial flood plains, and in valleys

This map unit consists of soils that formed in glacial outwash, recent alluvium, and lake-laid sediment. The landscape consists of broad flats in the major valleys in the central and southern parts of the county. Slopes are mainly 0 to 3 percent but range from 0 to 8 percent.

This unit makes up about 8 percent of the county. Chenango soils make up about 30 percent of the unit; Wayland soils, 10 percent; Swormville soils, 10 percent; and soils of minor extent, 50 percent.

The Chenango soils are well drained and somewhat excessively drained and have a medium textured and moderately coarse textured subsoil. The substratum is coarse textured and commonly is stratified. These soils are nearly level and gently sloping. They are on fans that formed in places where tributary streams enter the main valley. The rate of water movement is moderate or moderately rapid in the subsoil and rapid in the substratum. The water table usually is at a depth of 3 to 6 inches.

The Wayland soils are nearly level and are poorly drained and very poorly drained. They formed in silty

alluvial deposits. They have a medium textured and moderately fine textured subsoil and substratum. They are in low areas, old oxbows, and slack-water areas on flood plains. They are frequently flooded by adjacent streams. The rate of water movement is slow in the subsoil and substratum. An apparent seasonal high water table is at or near the surface for prolonged periods during the year.

The Swormville soils are somewhat poorly drained and are nearly level. They formed in a thin mantle of silty material that is underlain by sandy lake-laid sediment. They commonly are on broad flats in the major valleys. The rate of water movement is slow or moderately slow in the silty subsoil and moderately rapid in the sandy substratum. An apparent seasonal high water table is in the upper part of the subsoil from fall to late in spring.

The soils of minor extent include Minoa, Lamson, Red Hook, Halsey, Middlebury, Holderton, Raynham, Scio, Canandaigua, Valois, and Chautauqua soils. The somewhat poorly drained Minoa soils and the poorly drained and very poorly drained Lamson soils are sandy throughout. The somewhat poorly drained Red Hook soils and the very poorly drained Halsey soils have gravel throughout. The alluvial Middlebury and Holderton soils are on the flood plain and are better drained than the major soils. The moderately well drained Scio soils and the somewhat poorly drained Raynham soils are silty throughout. The very poorly drained Canandaigua soils are in the lower slack-water areas. They are silty. The well drained Valois soils are along the lower valley sides in areas where glacial outwash is mixed with glacial till. The moderately well drained Chautauqua soils formed in gravelly glacial till.

Most areas of this unit have been cleared and are farmed. The better drained Chenango soils are used for corn, small grain, or alfalfa grown in support of dairy farming. Flat, channery fragments in the surface layer can limit the planting and cultivation of some crops. The less well drained soils are used for hay or pasture. Areas of the more poorly drained soils generally remain wooded or are idle land that supports brush. Many areas on the alluvial fans provide good homesites. The prolonged seasonal wetness, the frequent flooding, and coarse fragments on the surface are the main limitations affecting most uses.

Areas Dominated by Very Deep Soils Formed in Organic Deposits

These soils make up about 1 percent of the county. They are in swampy basins in valleys and in low areas adjacent to ponds and lakes. They are very deep, very poorly drained, and nearly level.

11. Palms-Carlisle

Dominantly nearly level, very deep, very poorly drained organic soils; in swampy basins in valleys

This map unit consists of nearly level, mucky soils in swampy depressional areas. The landscape consists of broad flats in the major valleys and the lower areas adjacent to ponds and lakes. Slopes are mainly less than 2 percent but range from 0 to 3 percent.

This unit makes up about 1 percent of the county. Palms soils make up 50 percent of the unit; Carlisle soils, 30 percent; and soils of minor extent, 20 percent.

The Palms and Carlisle soils formed in well drained or partly decomposed organic deposits derived from herbaceous and woody plant remnants. They are in broad, depressional areas on lowlands and in valleys. In the Carlisle soils, the organic deposits are more than 51 inches thick over mineral soil layers. In the Palms soils, the organic deposits are 16 to 51 inches thick over mineral soil layers. The rate of water movement ranges from moderately slow to moderately rapid in the organic material, depending on the degree of compaction. In undrained areas the water table usually is at or near the surface.

The soils of minor extent include Halsey, Canandaigua, Henrietta, Alden, and Red Hook soils and Saprists and Aquents. The very poorly drained Halsey, Canandaigua, and Alden soils are mineral soils that occur near the edge of bogs. The very poorly drained Henrietta soils formed in shallow deposits of organic material less than 16 inches thick over sandy sediment. The somewhat poorly drained Red Hook soils are on gravel bars that extend into the bogs. Saprists and Aquents, more commonly called freshwater marsh, are in areas where shallow water covers the surface throughout most of the year.

Most areas of this unit support marsh grasses and water-tolerant shrubs and trees that provide habitat for wetland wildlife. Drained areas, which are at the outlet of Chautauqua Lake, are used for vegetable gardens. If drained, the major soils are exceptionally suited to specialty crops; however, drainage outlets are extremely difficult to establish because of the very low position of the soils on the landscape. This unit is not suitable for most kinds of community development because of flooding, ponding, prolonged wetness, and the unstable nature of the soils.

Areas Dominated by Moderately Deep Soils That Formed in Residual Material

These soils make up about 0.3 percent of the county. They formed in residual material less than 40 inches deep over siltstone or shale. They are at the higher

elevations in the southeast corner of the county. The soils are dominantly somewhat poorly drained to well drained.

12. Frewsburg-Carrollton

Dominantly gently sloping to moderately steep, moderately deep, somewhat poorly drained and well drained, moderately fine textured and medium textured soils that have a low content of lime; on uplands

This map unit consists of soils that formed in material weathered dominantly from acid shale, siltstone, and sandstone. The landscape consists of a broad plateau that is dissected by major drainageways. This unit is at the higher elevations in the southeast corner of the county. It is quite small and is the only unglaciated and frigid area in the county. Slopes are mainly 3 to 15 percent but range from 3 to 45 percent.

This unit makes up about 0.3 percent of the county. Frewsburg soils make up about 35 percent of the unit; Carrollton soils, 15 percent; and soils of minor extent, 50 percent.

The Frewsburg soils formed in residuum weathered from interbedded shale, siltstone, and sandstone. They are somewhat poorly drained and are 20 to 40 inches deep over bedrock. They are gently sloping and sloping and are on broad hilltops and summits. The rate of water movement is moderate in the upper part of the subsoil and moderately slow in the lower part of the subsoil and in the substratum. A perched seasonal high water table is in the upper part of the subsoil from late in fall through spring.

The Carrollton soils formed in residuum weathered from interbedded shale, siltstone, and sandstone. They are well drained and are 20 to 40 inches deep over bedrock. They are sloping to moderately steep and are on hilltops and valley sides. The rate of water movement is moderate in the subsoil. The water table commonly is at a depth of more than 6 feet.

The soils of minor extent include Kinzua, Onoville, Ivory, Valois, and Schuyler soils. The well drained Kinzua soils are very deep and are on the steeper side slopes. The moderately well drained Onoville soils are very deep and have a fragipan. The somewhat poorly drained Ivory soils are very deep and have a clayey subsoil and substratum. The well drained Valois soils and the moderately well drained Schuyler soils formed in glacial till and are at the edges of the residual deposits.

Most areas of this unit, particularly the gently sloping areas on hilltops, have been cleared and are used for farming. The steeper side slopes are wooded. Crops commonly grown include corn, hay, and small grain. Special varieties of crops must be used because of the shorter growing season. Some areas are used for Christmas trees. Providing proper drainage and controlling erosion are the main management needs. The seasonal wetness, the slope, the depth to bedrock, and the restricted movement of water in the subsoil are the main limitations affecting community development.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Busti series, for example, was named for the town of Busti in Chautauqua County.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Chenango gravelly loam, 3 to 8 percent slopes, is a phase of the Chenango series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Fluvaquents-Udifluvents complex, frequently flooded, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Saprists and Aquents, ponded, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

The detailed soil maps of Chautauqua County join with those of the adjacent counties, which are identified in the following paragraphs.

Warren County, Pennsylvania.—The same or similar soils match across the survey boundaries. Minor discrepancies are the result of differences in the design of the legends, changes in the concept of series, and differences in map scale (Warren County was mapped at a scale of 1:20,000, whereas Chautauqua County was mapped at a scale of 1:15,840). In all cases the kind of deposits, drainage, and slope join across the survey boundaries.

Erie County, Pennsylvania.—In most places the same or similar soils join across the survey boundaries. The main discrepancies are the result of changes in the concept of series and classification since the survey of Erie County was published in 1960. When the survey of Erie County is updated in the future, most of these

discrepancies will be eliminated. Other discrepancies are the result of differences in the scale of mapping. Erie County was mapped at a scale of 1:7,920 in the northern part and 1:20,000 in the southern part.

Seneca Nation of Indians, New York.—The same or very similar soils match across the survey boundaries. Seneca Nation of Indians was mapped at a scale of 1:24,000.

Cattaraugus County, New York.—This county does not have a modern published soil survey. A survey is currently in progress.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

Map Unit Descriptions

Ad—Alden mucky silt loam. This soil is very deep, nearly level, and very poorly drained. It commonly is in low areas, in depressions, and in headwater areas of streams. Individual areas are oblong or circular and range from 5 to 50 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; black mucky silt loam

Subsurface layer:
9 to 13 inches; gray, friable silt loam; yellowish brown mottles; 5 percent rock fragments

Subsoil:
13 to 24 inches; grayish brown, friable silt loam; yellowish brown and gray mottles; 10 percent rock fragments
24 to 35 inches; grayish brown, friable silt loam; strong brown and gray mottles; 10 percent rock fragments

Substratum:
35 to 72 inches; dark grayish brown, friable gravelly loam; 30 percent rock fragments

Included in mapping are small areas of the poorly drained Ashville soils in the slightly higher positions on the landscape. Also included are the very poorly drained Canandaigua soils, which are intermingled with areas of the Alden soil, and the poorly drained Wayland soils in low areas on flood plains. Canandaigua soils are more silty than the Alden soil. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Slightly acid or neutral in the surface layer, subsurface layer, and subsoil and neutral to moderately alkaline in the substratum
Surface runoff: Intermittently ponded or very slow
Hazard of erosion: Slight
Water table: As much as 1.0 foot above the surface or within a depth of 0.5 foot from November through June
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant shrubs and trees. Some areas are used as pasture. This soil meets the requirements for hydric soils.

Unless drained, this soil is poorly suited to most crops. If it is adequately drained and protected from ponding, however, it can be used for cultivated crops. Tile drains can be used in areas where outlets are available. Tilth is good. Incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and rotating crops improve tilth and help to maintain the content of organic matter. Tilling at the proper moisture content also minimizes compaction and clodding.

This soil is poorly suited to hay and pasture. The seasonal high water table restricts the growth of the roots of some forage crops. Prevention of overgrazing and restricted grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is too wet causes surface compaction and damages the pasture. Using proper stocking rates, selecting water-tolerant species for seeding, rotating livestock grazing, deferring grazing when the soil is wet, and controlling weeds and brush are the main management needs. Properly draining the soil improves forage production.

The potential productivity of this soil for red maple is moderate. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. Some trees are easily uprooted during windy periods. The wetness restricts the use of heavy logging equipment and makes machine planting of tree seedlings impractical.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements and for local roads and streets. Building on raised fill material and installing a drainage system reduce the wetness. The soil is too wet for the

construction of dwellings with basements. The better drained included soils are better sites for these dwellings.

The wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. The soil is too wet for septic tank absorption fields. Extensive engineering and design modifications are needed if the soil is used for onsite waste disposal systems.

Many areas of this soil are well suited to wetland wildlife habitat or to the development of recreational ponds.

The capability subclass is IVw.

AlA—Allard silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained. It is on silt-mantled outwash plains and stream terraces. Individual areas are rectangular or oblong and range from 5 to 75 acres in size. Slopes are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
8 to 16 inches; yellowish brown, very friable very fine sandy loam
16 to 30 inches; brown, very friable very fine sandy loam

Substratum:
30 to 72 inches; brown very gravelly loamy sand; 40 percent rock fragments

Included in mapping are small areas of soils that are similar to the Allard soil but are moderately well drained and are along drainageways. Also included are the moderately well drained Scio soils in slightly depressional areas where a thick mantle of silty material is underlain by gravelly deposits and soils that have a sandy or gravelly surface layer. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and rapid or very rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Small, scattered woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is well suited to most crops. It can be used intensively for row crops. It can be cultivated early in spring. Deep-rooted perennial crops, such as alfalfa, grow especially well. Crops respond well to frequent applications of lime and fertilizer. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the soil, growing cover crops or occasional sod crops, and minimizing tillage. The soil generally can be easily kept in good tilth.

This soil is well suited to hay and pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, deferring grazing when the soil is wet, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. Only a small acreage is wooded. Few limitations affect the use of logging equipment, and the hazards of erosion and windthrow are slight. The seedling mortality rate commonly is low because of the high available water capacity.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action.

This soil is suited to septic tank absorption fields, but care is needed to prevent the contamination of ground water resulting from the rapid or very rapid permeability in the substratum.

This soil is a good source of topsoil. If the silty overburden is removed, it also is a good source of sand and gravel. Some areas are excellent sites for athletic fields or for other recreational uses that require a nearly level, stone-free site.

The capability class is I.

AlB—Allard silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on silt-mantled outwash plains and stream terraces. Individual areas are rectangular or oblong and are 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
- 8 to 16 inches; yellowish brown, friable silt loam and very friable very fine sandy loam
- 16 to 30 inches; brown, very friable very fine sandy loam

Substratum:
- 30 to 72 inches; brown very gravelly loamy sand; 40 percent rock fragments

Included in mapping are small areas of soils that are similar to the Allard soil but are moderately well drained and are along drainageways. Also included are the moderately well drained Scio soils in slightly depressional areas where a thick mantle of silty material is underlain by gravelly deposits, soils that have a sandy or gravelly surface layer, and Chenango soils in areas of well sorted glacial outwash. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and rapid or very rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Small, isolated woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is well suited to most intensively grown crops. The crops that are planted early in spring and deep-rooted perennial crops, such as alfalfa, grow especially well. Erosion is a hazard, particularly in areas where slopes are long. Farming on the contour and stripcropping help to control erosion. Returning crop residue to the soil, growing cover crops, and minimizing tillage help to maintain tilth and increase the content of organic matter. The soil generally can be easily kept in good tilth.

This soil is well suited to hay and pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, deferring grazing when the soil is wet, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. Only a small acreage is wooded. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate commonly is low because of the high available water capacity.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action.

This soil is suited to septic tank absorption fields, but care is needed to prevent the contamination of ground water resulting from the rapid or very rapid permeability in the substratum.

This soil is a good source of topsoil. If the silty overburden is removed, it also is a good source of sand and gravel.

The capability subclass is IIe.

As—Ashville silt loam. This soil is nearly level, very deep, and poorly drained. It is along drainageways, on broad flats, and in small depressions on glaciated uplands. Individual areas are circular or oblong and range from 5 to 30 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 9 inches; very dark gray silt loam

Subsoil:
- 9 to 12 inches; grayish brown, friable silt loam; yellowish brown and strong brown mottles
- 12 to 21 inches; grayish brown, friable silt loam; strong brown and light gray mottles; 10 percent rock fragments
- 21 to 36 inches; grayish brown, mottled, firm silt loam; 10 percent rock fragments

Substratum:
- 36 to 72 inches; brown, friable gravelly silt loam; 30 percent rock fragments

Included in mapping are small areas of Canandaigua, Fremont, and Busti soils. Canandaigua soils are silty throughout. They are on broad flats. The somewhat poorly drained Fremont and Busti soils are on the slightly higher rises and knolls. Also included are small areas of soils having a silty colluvial surface layer that is thicker than that of the Ashville soil. Included areas make up about 10 to 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow in the subsoil, and slow or moderately slow in the substratum
Available water capacity: High

Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and moderately alkaline in the substratum
Surface runoff: Intermittently ponded to slow
Hazard of erosion: Slight
Water table: Within a depth of 1 foot from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used as pasture. Some areas support water-tolerant vegetation and trees. Some drained areas are used for cultivated crops or hay. This soil meets the requirements for hydric soils.

Unless drained, this soil is poorly suited to cultivated crops. If the soil is protected against excessive runoff from the adjacent soils and is drained, selected crops can be grown. Generally, the soil is in low depressions that are surrounded by better drained soils. If subsurface tile is installed to improve drainage and open ditches are provided to divert runoff, the soil can be farmed along with the better drained adjacent soils. Tilling only when the soil is at the proper moisture content, incorporating crop residue into the soil, and rotating crops improve tilth and help to maintain the content of organic matter. Tilling at the proper moisture content also minimizes compaction and clodding.

This soil is poorly suited to hay and pasture. The seasonal high water table restricts the growth of the roots of some forage crops. Prevention of overgrazing and restricted grazing when the soil is wet are the main concerns in managing pasture. If the pasture is grazed during wet periods, the surface layer can easily become compacted. Using proper stocking rates, selecting water-tolerant species for seeding, rotating livestock grazing, deferring grazing when the soil is wet, and controlling weeds and brush are the main management needs. Improving drainage increases forage production.

The potential productivity of this soil for red maple is moderate. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. Some trees are easily uprooted during windy periods. The wetness restricts the use of logging equipment and makes machine planting of tree seedlings impractical.

Prolonged wetness is the main limitation on sites for dwellings with basements and for local roads and streets. Building on raised fill material and installing a drainage system help to overcome this limitation. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Fremont and Busti soils are better sites for these dwellings.

The wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of moderately slow permeability and wetness, the included areas of Busti soils also are limited as sites for septic tank absorption fields, but they are better suited than this soil.

In many areas this soil is well suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is IVw.

BrA—Barcelona silt loam, 0 to 3 percent slopes. This soil is nearly level, deep, and somewhat poorly drained. It formed in glacial lake-laid sediment and in the underlying glacial till. It is in areas on lake plains where bedrock is at a depth of 40 to 60 inches. Individual areas are oblong. They commonly are 5 to 75 acres in size, but some are as large as 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsurface layer:
9 to 15 inches; grayish brown, mottled, friable silt loam

Subsoil:
15 to 29 inches; brown, mottled, firm silty clay loam
29 to 35 inches; brown, mottled, firm channery silt loam; 15 percent rock fragments

Substratum:
35 to 51 inches; brown, firm channery silt loam; 35 percent rock fragments

Bedrock:
51 inches; dark, rippable shale

Included in mapping are small areas of Rhinebeck and Churchville soils, which have more clay in the subsoil than the Barcelona soil and are very deep over bedrock, and small areas of Niagara soils, which are very deep over bedrock and are not underlain by glacial till. Also included are small areas of soils that are similar to the Barcelona soil but are poorly drained and are in depressions and along drainageways and small areas of soils that have bedrock within a depth of 40 inches. Included areas make up about 10 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow in the subsurface layer and in the upper part of

the subsoil, and moderately slow or moderate in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer and moderately acid to moderately alkaline in the subsurface layer, subsoil, and substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 40 to 60 inches

Most of the acreage is idle land or scrubland. Cleared areas are used for cultivated crops, vegetables, hay, or vineyards. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Undrained areas are better suited to short-season crops and to hay and pasture. Wetness delays tillage in spring and makes harvesting difficult in fall. Crops in depressional areas are damaged during prolonged wet periods. The soil is subject to puddling and compaction if it is tilled when wet. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Growing cover crops, returning crop residue to the soil, and including sod crops in the cropping system help to maintain good tilth and minimize crusting and clodding.

This soil is suited to water-tolerant hay and to late-spring pasture. Grazing when the soil is wet is the main concern in managing pasture. It causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, restricting grazing when the soil is wet, and controlling brush and weeds by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of planting and harvesting equipment and increases the seedling mortality rate. The trees growing on this soil generally can withstand high winds. Those that can withstand the seasonal wetness grow best.

The seasonal high water table and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. The seasonal wetness and frost action are limitations on sites for local roads and streets. Where outlets are available, installing drains around footings reduces the wetness. Building on raised fill material and installing a drainage system reduce the wetness and the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness.

The capability subclass is IIIw.

BrB—Barcelona silt loam, 3 to 8 percent slopes. This soil is gently sloping, deep, and somewhat poorly drained. It formed in glacial lake-laid sediment and in the underlying glacial till. It is in areas on lake plains where bedrock is at a depth of 40 to 60 inches. Individual areas are oblong and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsurface layer:
9 to 15 inches; grayish brown, mottled, friable silt loam

Subsoil:
15 to 29 inches; brown, mottled, firm silty clay loam
29 to 35 inches; brown, mottled, firm channery silt loam; 15 percent rock fragments

Substratum:
35 to 51 inches; brown, firm very channery silt loam; 35 percent rock fragments

Bedrock:
51 inches; dark, rippable shale

Included in mapping are small areas of Rhinebeck and Churchville soils, which have more clay in the subsoil than the Barcelona soil and are very deep over bedrock, and small areas of Niagara soils, which are very deep over bedrock and are not underlain by glacial till. Also included are small areas of soils that are similar to the Barcelona soil but are poorly drained and are in depressions and along drainageways. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow in the subsurface layer and in the upper part of the subsoil, and moderately slow or moderate in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer and moderately alkaline in the subsurface layer, subsoil, and substratum
Surface runoff: Medium

Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 40 to 60 inches

Most of the acreage is idle land or scrubland. Some areas are vineyards that have been abandoned. Cleared areas are used for cultivated crops, vegetables, hay, or vineyards. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. If a drainage system is installed and tilth and fertility are maintained, the soil is suited to many of the crops commonly grown in the county. Undrained areas are better suited to short-season crops and to hay and pasture. Wetness delays tillage in spring and makes harvesting difficult in fall. Erosion is a hazard in intensively cultivated areas where slopes are long. Interceptor drains can divert runoff and seepage from the higher adjacent soils and thus reduce the hazard of erosion. Puddling and compaction can occur if the soil is tilled when wet. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Minimizing tillage, growing cover crops, tilling across the slope, returning crop residue to the soil, including grasses and legumes in the cropping system, and plowing only when the soil is at the proper moisture content help to maintain good tilth and control erosion.

Unless a drainage system is installed, this soil is best suited to the hay and pasture plants that can withstand wetness. Grazing when the soil is wet is the main concern in managing pasture. It causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, restricting grazing when the soil is wet, and controlling brush and weeds by mowing annually are desirable management practices.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of planting and harvesting equipment and increases the seedling mortality rate. The trees growing on this soil generally can withstand high winds. Those that can withstand the seasonal wetness grow best.

The seasonal high water table and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. The seasonal wetness and frost action are limitations on sites for local roads and streets. Where outlets are available, installing drains around footings reduces the wetness. Building on raised fill material and installing a drainage system reduce the wetness and the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness.

This soil is subject to severe erosion if the plant cover is removed during construction.

The capability subclass is IIIw.

BsA—Busti silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on broad flats and in long, narrow areas along drainageways. Some areas receive runoff from the higher adjacent soils. Individual areas are irregularly shaped or oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown silt loam

Subsoil:
8 to 12 inches; dark grayish brown, mottled, friable silt loam
12 to 19 inches; brown, mottled, friable silt loam
19 to 27 inches; brown, mottled, firm gravelly silt loam; 30 percent gravel

Substratum:
27 to 72 inches; dark grayish brown, firm gravelly silt loam; 30 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in low pockets and along drainageways; Erie soils, which have a fragipan in the subsoil; and Fremont soils, which have a higher content of clay in the subsoil than the Busti soil. Included areas make up about 10 to 15 percent of this unit.

Soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and slow or moderately slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral throughout the profile
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through April

Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to farming. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Busti soils. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Wetness can be reduced in some areas by diverting runoff from the adjacent slopes and by installing tile and open-ditch drainage systems. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damages the pasture. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

BsB—Busti silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is in convex areas on uplands, on side slopes, and in concave areas on foot slopes that receive runoff from the higher adjacent soils. Individual areas are irregularly shaped or rectangular. Most range from 10 to 75 acres in size, but some are as large as 100 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown silt loam

Subsoil:
8 to 12 inches; dark grayish brown, mottled, friable silt loam
12 to 19 inches; brown, mottled, friable silt loam
19 to 27 inches; brown, mottled, firm gravelly silt loam; 30 percent gravel

Substratum:
27 to 72 inches; dark grayish brown, firm gravelly silt loam; 30 percent coarse gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Erie soils, which have a fragipan in the subsoil; and Fremont soils, which have a higher content of clay in the subsoil than the Busti soil. Also included are small areas of the moderately well drained Chautauqua soils on slight rises and knolls. Included areas make up 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and slow or moderately slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral throughout the profile
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through April
Root zone: About 24 inches thick
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Undrained areas are better suited to short-season crops and to hay and pasture. Wetness delays tillage in spring and makes harvesting difficult in fall. If drained and

Figure 4.—Hay in an area of Busti silt loam, 3 to 8 percent slopes. This soil is considered prime farmland.

protected from erosion, the soil is suited to most of the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to hay and to late-spring pasture (fig. 4). Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of planting and harvesting equipment and increases the seedling

mortality rate. Trees can be uprooted during periods of high winds. The trees that can withstand the seasonal wetness grow best.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

BsC—Bustl silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on side slopes and foot slopes that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown silt loam

Subsoil:
8 to 12 inches; dark grayish brown, mottled, friable silt loam
12 to 19 inches; brown, mottled, friable silt loam
19 to 27 inches; brown, mottled, firm gravelly silt loam; 30 percent gravel

Substratum:
27 to 72 inches; dark grayish brown, firm gravelly silt loam; 30 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in seepage spots on foot slopes and along drainageways and small areas of the moderately well drained Chautauqua soils in the higher positions on knolls and ridges. Also included are small areas of Erie soils, which have a fragipan in the subsoil. Included soils make up 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and slow or moderately slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral throughout the profile
Surface runoff: Rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through April
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the acreage is wooded or is idle land that is reverting to woodland.

This soil is moderately well suited to farming. If drained and protected from erosion, it can be used for most of the crops commonly grown in the county. Undrained areas are better suited to short-season crops and to hay and pasture. Wetness delays planting in spring and makes harvesting difficult in fall. Interceptor drains can divert runoff and seepage from the higher adjacent soils. Tile can drain the wetter included soils and thus permit a more uniform use of the fields. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to hay and to late-spring pasture. Grazing when the soil is wet damages the pasture. If the plant cover is depleted as a result of overgrazing, the hazard of erosion is increased. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of planting and harvesting equipment and increases the seedling mortality rate. Trees are susceptible to windthrow. The trees that can withstand the seasonal wetness grow best. Building logging roads and skid trails on the contour helps to control erosion.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing

roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

Ca—Canadice silty clay loam. This soil is very deep, nearly level, and poorly drained. It is in depressions on lake plains and in the major valleys. Individual areas are oblong or circular and range from 10 to 30 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark gray silty clay loam

Subsoil:
9 to 24 inches; grayish brown, mottled, firm silty clay loam
24 to 32 inches; grayish brown, firm silty clay that has many mottles
32 to 40 inches; gray, mottled, firm silty clay

Substratum:
40 to 70 inches; grayish brown, mottled, firm silty clay

Included in mapping are small areas of the somewhat poorly drained Rhinebeck soils on the slightly elevated parts of the landscape and small areas of Canandaigua soils, which are more silty than the Canadice soil. Also included are small areas of soils that have a mucky surface layer and are in depressions and potholes and small areas of soils that are underlain by pebbles and are adjacent to gravelly beach ridges. Included areas make up about 20 to 30 percent of this unit.

Soil properties—

Permeability: Moderate or moderately slow in the surface layer and very slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Very strongly acid to slightly acid in the surface layer, strongly acid to neutral in the subsoil, and neutral to moderately alkaline in the substratum
Surface runoff: Intermittently ponded to slow
Hazard of erosion: Slight
Water table: Within a depth of 1 foot from December through June
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Some areas are used for hay or pasture. This soil meets the requirements for hydric soils.

This soil is poorly suited to cultivated crops unless it is drained. Draining the soil commonly is difficult because slopes are nearly level and suitable outlets are not available. A combination of surface and tile drains is needed. Because of the slow permeability, the subsurface drains should be closely spaced. Where a drainage system is feasible, the soil can be used for selected crops, but maintaining tilth is a management concern. Because of the high content of clay, clodding and crusting of the surface are management concerns. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain good tilth and the content of organic matter.

This soil is suited to hay and to late-spring pasture. Undrained areas cannot be grazed in spring because of the risk of damage to the surface layer. Overgrazing and surface compaction can damage desirable plant species and cause water to pond on the surface. Partially draining the soil, using proper stocking rates, rotating livestock grazing, controlling brush and weeds by mowing annually, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. Some trees are easily uprooted during windy periods. The wetness restricts the use of heavy logging equipment and makes machine planting of tree seedlings impractical.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements and for local roads and streets. Building on raised fill material and installing a drainage system reduce the wetness. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Rhinebeck soils are better sites for these dwellings.

Prolonged wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of

restricted permeability and wetness, the included areas of Rhinebeck soils also are limited as sites of septic tank absorption fields, but they are better suited than this soil.

In many areas this soil is well suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is IVw.

Cb—Canandaigua silt loam, loamy substratum. This soil is very deep, nearly level, and poorly drained. It is mainly in flat areas on lake plains and to a lesser extent in the major valleys. Individual areas are oblong. They generally range from 10 to 50 acres in size, but some are as large as 100 acres or more. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; very dark grayish brown silt loam

Subsoil:
10 to 16 inches; grayish brown, mottled, friable silty clay loam
16 to 36 inches; grayish brown, mottled, friable silt loam

Substratum:
36 to 45 inches; brown, mottled, friable silt loam
45 to 60 inches; brown, gray, and strong brown, mottled, firm silt loam
60 to 72 inches; dark gray, firm gravelly silt loam; 20 percent gravel

Included in mapping are small areas of the somewhat poorly drained Niagara soils in the slightly higher positions on the landscape; the poorly drained Lamson soils, which have more sand in the subsoil than the Canandaigua soil; the poorly drained Canadice soils, which have more clay in the subsoil than the Canandaigua soil; and the very poorly drained Canandaigua soils that have a mucky surface layer and are in small depressions. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to mildly alkaline in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Surface runoff: Very slow or intermittently ponded
Hazard of erosion: Slight
Water table: Within a depth of 1 foot from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Cleared areas are used for low-quality hay or pasture. Areas on lake plains are used for vegetables or vineyards. This soil meets the requirements for hydric soils.

Unless drained, this soil is poorly suited to cultivated crops. If drained, it is suited to most of the crops commonly grown in the county, except for early and late season crops. Generally, some combination of open ditches and closely spaced subsurface drains is desirable. Locating drainage outlets is difficult in some areas. If tile drains are installed, care is needed to keep them from being plugged by silt and very fine sand. Good tilth can be maintained fairly easily. The soil is subject to puddling and compaction if it is tilled when wet. Growing cover crops, incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and rotating crops help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. It cannot be used as pasture early in spring because compaction can damage desirable plants and result in ponding. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush by mowing annually, and restricting grazing when the soil is wet are the main management needs. Improving drainage increases forage production.

The potential productivity of this soil for red maple is moderate. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. Some trees are easily uprooted during windy periods. The wetness restricts the use of heavy logging equipment and makes machine planting of tree seedlings impractical.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements and for local roads and streets. Building on raised fill material and installing a drainage system reduce the wetness and the potential for frost action. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Niagara soils are better sites for these dwellings.

Prolonged wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of slow permeability and wetness, the included areas of

Niagara soils also are limited as sites for septic tank absorption fields, but they are better suited than this soil.

In many areas this soil is well suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is IVw.

Cc—Canandaigua mucky silt loam. This soil is very deep, nearly level, and very poorly drained. It is mainly in low areas in the major valleys and to a lesser extent in depressions on lake plains. Individual areas are oblong or irregularly shaped. They commonly range from 10 to 75 acres in size, but some are as large as 100 acres or more. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; very dark gray mucky silt loam

Subsoil:

10 to 16 inches; grayish brown, mottled, friable silty clay loam

16 to 36 inches; grayish brown, mottled, friable silt loam

Substratum:

36 to 45 inches; brown, mottled, friable silt loam

45 to 60 inches; brown, gray, and strong brown, mottled, firm silt loam

60 to 72 inches; dark gray, firm gravelly silt loam; 20 percent gravel

Included in mapping are small areas of Alden soils, which have coarse fragments in the lower part of the subsoil and in the substratum; a few small pockets of Palms muck; and small areas of soils that do not have a mucky surface layer. Included areas make up about 10 to 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to mildly alkaline in the surface layer and subsoil and neutral to moderately alkaline in the substratum
Surface runoff: Very slow or intermittently ponded
Hazard of erosion: Slight
Water table: At the surface to 1 foot above from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant shrubs and trees. Some areas are used for pasture. This soil meets the requirements for hydric soils.

Unless drained, this soil is not suited to cultivated crops. If drained, it is suited to most of the crops commonly grown in the county, except for early and late season crops. The main limitation is the scarcity of suitable drainage outlets. Where adequate outlets can be established, standard management practices include growing cover crops, incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and rotating crops. These practices help to maintain tilth and increase the content of organic matter.

A partial drainage system is desirable if this soil is used for hay or pasture. Grazing when the soil is wet causes surface compaction, damage to the pasture, and poor plant growth. Using proper stocking rates, selecting water-tolerant species for seeding, rotating livestock grazing, deferring grazing when the soil is wet, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for red maple is moderate. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. Some trees are easily uprooted during windy periods. The wetness restricts the use of heavy logging equipment and makes machine planting of tree seedlings impractical.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements and for local roads and streets. Building on raised fill material and installing a drainage system reduce the wetness. The soil is too wet for the construction of dwellings with basements.

Ponding in spring, prolonged wetness, and the restricted permeability in the subsoil and substratum are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. The soil is too wet for use as a site for septic tank absorption fields.

In many areas this soil is well suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is Vw.

CdB—Canaseraga silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained or moderately well drained. It is in convex areas on hilltops and side slopes that receive little or no runoff from the higher adjacent soils. Individual areas are

oblong or circular and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 2 inches; very dark grayish brown silt loam

Subsoil:

2 to 12 inches; yellowish brown, mottled, friable silt loam

12 to 23 inches; brown, friable silt loam

23 to 55 inches; a fragipan of brown, mottled, firm gravelly loam; 25 percent rock fragments

Substratum:

55 to 72 inches; dark brown, mottled, firm gravelly loam; 25 percent gravel

Included in mapping are small areas of the somewhat poorly drained Dalton soils in small depressions and along drainageways; Schuyler soils, which do not have a firm fragipan; and soils having a silty mantle that is less than 20 inches thick. Included areas make up about 10 to 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow in the fragipan and substratum

Available water capacity: Moderate

Soil reaction: Very strongly acid to moderately acid in the surface layer and in the upper part of the subsoil, strongly acid to neutral in the fragipan, and moderately acid to moderately alkaline in the substratum

Surface runoff: Medium

Hazard of erosion: Moderate

Water table: Perched at a depth of 1 to 4 feet from March through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas are used for row crops, hay, or pasture. The row crops are grown in support of dairy farming. Some areas are used as woodland. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county, but the wetness can delay planting early in spring. Erosion is a hazard on long slopes. Random tile drains are needed in the wetter included soils so that the fields can be managed more uniformly. Measures that maintain tilth, increase the content of organic matter, and control erosion include minimum tillage, tilling only when the soil is at the proper moisture content, incorporating crop residue into the soil, and growing cover crops. The plow layer commonly has no stones and can be easily tilled. Farming on the contour and stripcropping help to control erosion on long slopes. Crops respond well to applications of lime and fertilizer.

This soil is suited to hay and pasture. Overgrazing and grazing when the soil is wet compact the surface layer and cause temporary ponding. Topdressing with lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs.

The potential productivity of this soil for eastern white pine is very high. Few limitations affect the use of logging equipment. The hazards of windthrow and erosion are slight, and the seedling mortality rate is low.

The perched seasonal high water table is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome this limitation.

The seasonal wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

This soil is subject to erosion if the plant cover is removed during construction.

The capability subclass is IIe.

CdC—Canaseraga silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained or moderately well drained. It is in areas on hilltops and side slopes that receive runoff from the higher adjacent soils. Individual areas are circular or oblong and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 2 inches; very dark grayish brown silt loam

Subsoil:

2 to 12 inches; yellowish brown, friable silt loam

12 to 23 inches; brown, friable silt loam

23 to 55 inches; a fragipan of brown, mottled, firm gravelly loam; 25 percent gravel

Substratum:

55 to 72 inches; dark brown, mottled, firm gravelly loam; 25 percent gravel

Included in mapping are small areas of the somewhat poorly drained Dalton soils along drainageways and in seepage spots; Schuyler soils, which do not have a firm fragipan; and soils having an eroded silty mantle that is less than 15 inches thick. Included areas make up 10 to 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and in the upper part of the subsoil, strongly acid to neutral in the fragipan, and moderately acid to moderately alkaline in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1 to 4 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or idle land. Some areas have been cleared and are used for row crops, hay, or pasture. The row crops are grown in support of dairy farming.

This soil is moderately well suited to most of the crops commonly grown in the county. The wetness can delay planting early in spring and can interfere with harvesting. Careful management is needed to control erosion and maintain fertility. A drainage system is needed on the wetter included soils to permit more uniform management of the fields. Contour farming and contour stripcropping in combination with diversions, terraces, or grassed waterways help to control erosion. The plow layer commonly has no stones and can be easily tilled. Incorporating crop residue into the soil, rotating crops, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter.

This soil is suited to hay and pasture. Overgrazing and surface compaction are the main management concerns. Compaction seals the surface and thus increases the runoff rate and the hazard of erosion. Overgrazing results in increased erosion. Forage plants, including deep-rooted legumes, can be grown if lime and fertilizer are applied. Other suitable pasture management practices include using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually.

The potential productivity of this soil for eastern white pine is very high. Few limitations affect the use of logging equipment. The hazard of windthrow is slight, and the seedling mortality rate is low. The hazard of erosion is moderate. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails.

The perched seasonal high water table and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Also, installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings.

Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome this limitation.

The seasonal wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

Ce—Carlisle muck. This organic soil is nearly level, very deep, and very poorly drained. It is in bogs and swamps on the lowest parts of the landscape. Most areas are adjacent to lakes. Individual areas are circular or oval. They commonly range from 10 to 50 acres in size, but some are as large as several hundred acres. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 42 inches; black sapric material

Subsurface layer:
42 to 90 inches; dark grayish brown sapric material
90 inches; very dark grayish brown sapric material

Included in mapping are small areas of Palms muck. This soil is organic to a depth of less than 51 inches. It is mainly at the edges of the mapped areas. It makes up less than 10 percent of this unit.

Soil properties—

Permeability: Moderately slow to moderately rapid

Figure 5.—A garden plot in an area of Carlisle muck, near Jamestown.

Available water capacity: High
Soil reaction: Moderately acid to neutral throughout the profile
Surface runoff: Very slow
Hazard of erosion: Slight
Water table: 0.5 foot above the surface to 1.0 foot below from September through June
Flooding: None
Depth to bedrock: More than 6 feet

Most areas support cattails and water-tolerant grasses, sedges, brush, and trees. Some areas near the city of Jamestown are used for vegetable gardens (fig. 5).

In undrained areas this soil is not suited to farming. It is permanently wet. Draining the soil is extremely difficult. If drained, the soil is well suited to vegetables. After it has been drained, it shrinks and settles as a result of compaction, decomposition, and wind erosion. Controlled drainage commonly is needed to accommodate the needs of crops for moisture and to reduce the amount of shrinkage and the rate of decomposition. Intensively used areas are highly susceptible to wind erosion. Windbreaks are needed to reduce the extent of soil loss and crop damage.

Undrained areas commonly are poorly suited to hay and pasture. Surface compaction and trampling of desirable grasses are serious management concerns if these areas are grazed.

The potential productivity of this soil for red maple is moderate. Because of prolonged wetness, the equipment limitation, the seedling mortality rate, and the hazard of windthrow are management concerns. Only the trees that can withstand extreme wetness can be grown. Most of the trees are established on windthrow mounds.

Prolonged wetness, excessive humus, frequent ponding, compressibility, and a high risk of frost action are serious limitations on sites for dwellings with basements, for local roads and streets, and for septic tank absorption fields.

Many areas are suited to wetland wildlife habitat.

The capability subclass is Vw.

CfC—Carrollton channery silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and well drained. It is in convex areas on hilltops and side slopes that do not receive runoff from the higher adjacent soils. It is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are oblong or circular and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches; dark brown channery silt loam

Subsurface layer:
4 to 10 inches; yellowish brown, friable channery silt loam; 20 percent rock fragments

Subsoil:
10 to 17 inches; strong brown, friable channery silty clay loam; 15 percent rock fragments
17 to 27 inches; yellowish brown, firm channery silt loam; 20 percent rock fragments

Bedrock:
27 inches; olive gray siltstone and shale

Included in mapping are small areas of the somewhat poorly drained Frewsburg soils along drainageways and in seepage spots and small areas of Kinzua and Onoville soils, which are more than 40 inches deep over bedrock. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Moderately rapid
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches

Many areas that were formerly cleared for crop production are now idle and are reverting to brush and trees. Some areas are used for crops or pasture. Some are used for the production of Christmas trees (fig. 6). The remaining areas are wooded.

This soil is moderately well suited to most of the crops commonly grown in the county. Erosion is a moderate hazard in intensively cultivated areas. Installing subsurface drains commonly is difficult in the wet included areas because of a restricted depth to bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control erosion. Incorporating crop residue into the soil, rotating crops, minimizing tillage, and growing cover crops help to maintain tilth, increase the content of organic matter, and control erosion. Crops respond well to applications of lime and fertilizer. Droughtiness is a limitation in some years.

This soil is well suited to hay and early spring pasture. Overgrazing restricts plant growth and can deplete the stand of desirable pasture plants, especially in dry years. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush by mowing annually, and applying sufficient amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion, the equipment limitation, and the hazard of windthrow are slight, and the seedling mortality rate is low. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails. Large areas of this soil are suitable for machine planting of seedlings.

The depth to bedrock and the slope are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock commonly can be ripped with a backhoe. Installing drains around footings helps to remove any lateral seepage moving through fractures in the bedrock.

Frost action and the slope are the main limitations on sites for local roads and streets. Extensive land modification and leveling may be necessary to overcome the slope. Adding coarse textured subgrade or base material reduces the potential for frost action.

The moderate depth to bedrock is the main limitation on sites for septic tank absorption fields. The shale bedrock commonly can be ripped. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

CfD—Carrollton channery silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately deep, and well drained. It is on uniformly sloping valley sides that receive runoff from the higher adjacent soils. It is at the higher elevations, where the mean annual air temperature is less than 47 degrees F.

Figure 6.—An area of Carrollton channery silt loam, 8 to 15 percent slopes, used for Christmas trees. The production of Christmas trees is increasing in Chautauqua County.

Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches; dark brown channery silt loam

Subsurface layer:

4 to 10 inches; yellowish brown, friable channery silt loam; 20 percent rock fragments

Subsoil:

10 to 17 inches; strong brown, friable channery silty clay loam; 15 percent rock fragments

17 to 27 inches; yellowish brown, firm channery silt loam; 20 percent rock fragments

Bedrock:

27 inches; olive gray siltstone and shale

Included in mapping are small areas of the somewhat poorly drained Frewsburg soils in seepage spots; Kinzua soils, which have bedrock at a depth of more than 40 inches; and soils that have bedrock within a depth of 20 inches. Included areas make up about 10 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: 20 to 40 inches

Most areas are used as woodland. Some areas are

used for hay or pasture or for row crops grown in support of dairy farming.

This soil is poorly suited to cultivated crops because of the hazard of erosion and the slope. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, tilling across the slope, stripcropping, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and control erosion. Because of the slope, operating farm machinery is difficult and hazardous on this soil. Droughtiness is a limitation in some years.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing restricts plant growth and can deplete the stand of desirable pasture plants, especially in dry years. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs. Because the soil is naturally acid, applications of lime are needed to improve the growth of most pasture plants.

The potential productivity of this soil for sugar maple is moderate. Because of the slope, the use of equipment is restricted and the hazard of erosion is moderate. The hazard of windthrow and seedling mortality are slight. Seedlings grow better if they are planted early in spring, when the soil is moist. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails.

The slope and the restricted depth to bedrock are the main limitations on sites for dwellings with basements and for local roads and streets. Extensive land modification may be necessary to overcome the slope. Although excavation may be costly, the shale bedrock generally can be ripped with a backhoe. Installing drains around footings helps to remove any lateral seepage moving through fractures in the bedrock.

The moderate depth to bedrock and the slope are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications may be necessary to overcome the slope. The shale bedrock commonly can be ripped. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

ChB—Chadakoin silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is in convex areas on hilltops that receive little or no runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches; dark grayish brown silt loam

Subsoil:
4 to 13 inches; yellowish brown, friable silt loam
13 to 24 inches; dark yellowish brown, friable silt loam; 10 percent gravel
24 to 43 inches; dark yellowish brown, friable gravelly loam; 20 percent gravel

Substratum:
43 to 72 inches; dark brown, friable gravelly loam; 30 percent gravel

Included in mapping are small areas of the moderately well drained Chautauqua soils; the moderately well drained Schuyler soils, which have more clay in the subsoil than the Chadakoin soil; and Chadakoin soils that have a channery surface layer. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow or moderate in the lower part of the subsoil and in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: At a depth of 3 to 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming. Small woodlots are in some areas, and some of the acreage is idle land that is reverting to shrubs and brush. This soil meets the requirements for prime farmland.

This soil is well suited to all of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted perennial crops, such as alfalfa, grow especially well. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard if the soil is

intensively cultivated and is not protected by a plant cover. Incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and control erosion. Farming on the contour and stripcropping help to control erosion and conserve water during the growing season. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs.

The potential productivity of this soil for red oak is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIe.

ChC—Chadakoin silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained. It is in convex areas on hilltops and side slopes that receive runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches; dark grayish brown silt loam

Subsoil:

4 to 13 inches; yellowish brown, friable silt loam

13 to 24 inches; dark yellowish brown, friable silt loam; 10 percent gravel

24 to 43 inches; dark yellowish brown, friable gravelly loam; 20 percent gravel

Substratum:

43 to 72 inches; dark brown, friable gravelly loam; 30 percent gravel

Included in mapping are small areas of the moderately well drained Chautauqua and somewhat poorly drained Busti soils along drainageways and in seepage spots; the moderately well drained Schuyler soils, which have more clay in the subsoil than the Chadakoin soil; and Chadakoin soils that have a channery surface layer. Included areas make up about 20 to 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow or moderate in the lower part of the subsoil and in the substratum

Available water capacity: Moderate

Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum

Surface runoff: Moderately rapid

Hazard of erosion: Moderate

Water table: At a depth of 3 to 6 feet

Flooding: None

Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that i reverting to shrubs and brush. Some areas have been cleared and are used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming.

This soil is moderately well suited to most of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted perennial crops, such as alfalfa, grow especially well. Erosion is a serious hazard in intensively cultivated areas. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control erosion. Incorporating crop residue into the soil, minimizing tillage, including sod crops in the crop rotation, and growing cover crops help to maintain tilth and increase the content of organic matter. Installing drainage tile in the wet included areas helps to make management of the fields more efficient. Crops respond well to applications of lime and fertilizer. Legumes respond especially well. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing

season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are other management needs.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The slope is the main limitation on sites for dwellings with basements and for local roads and streets. Frost action also is a limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

ChD—Chadakoin silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on uniformly sloping valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 15 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 4 inches; dark grayish brown silt loam

Subsoil:

4 to 13 inches; yellowish brown, friable silt loam
13 to 24 inches; dark yellowish brown, friable silt loam; 10 percent gravel
24 to 43 inches; dark yellowish brown, friable gravelly loam; 20 percent gravel

Substratum:

43 to 72 inches; dark brown, friable gravelly loam; 30 percent gravel

Included in mapping are small areas of the moderately well drained Chautauqua and somewhat poorly drained Busti soils along drainageways and in seepage spots; Schuyler soils, which have more clay in the subsoil than the Chadakoin soil; and Towerville soils, which have bedrock within a depth of 40 inches. Also included are small areas of Chadakoin soils that have a channery surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow or moderate in the lower part of the subsoil and in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of 3 to 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay or pasture. A small acreage is used for row crops.

This soil is poorly suited to cultivated crops because of the severe hazard of erosion and the slope. Operating farm equipment is difficult and hazardous because of the slope. Erosion is a serious hazard in cultivated areas. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, tilling across the slope, stripcropping, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and control erosion. Liberal applications of lime and fertilizer are needed to maintain crop growth. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes can be grown, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. If plowing is necessary to establish a plant cover, plowing across the slope and leaving strips of sod help to control runoff. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs.

The potential productivity of this soil for red oak is

moderate. The use of logging equipment is limited by the slope. The hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements and for local roads and streets. Extensive land modification and grading may be needed to overcome the slope. Frost action is an additional limitation on sites for local roads and streets. Installing roadside drainage systems helps to overcome this limitation.

The seasonal wetness, the restricted permeability in the substratum, and the slope are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope. Installing a subsurface drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

ChE—Chadakoin silt loam, 25 to 35 percent slopes. This soil is steep, very deep, and well drained. It is on the side slopes of hills and on valley walls. It is in areas that receive runoff from the higher adjacent soils. Individual areas are oblong or occur as narrow strips on the side slopes. They range from 10 to several hundred acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches; dark grayish brown silt loam

Subsoil:
4 to 13 inches; yellowish brown, friable silt loam
13 to 24 inches; dark yellowish brown, friable silt loam; 10 percent gravel
24 to 43 inches; dark yellowish brown, friable gravelly loam; 20 percent gravel

Substratum:
43 to 72 inches; dark brown, friable gravelly loam; 30 percent gravel

Included in mapping are small areas of the moderately well drained Schuyler soils, which have more clay in the subsoil than the Chadakoin soil; Towerville soils, which have bedrock within a depth of 40 inches; and soils that have a channery surface layer. Also included are narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow in the lower part of the subsoil and in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of 3 to 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded and provide habitat for wildlife. Some of the acreage is idle land or is used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm equipment is very difficult because of the slope. A plant cover that controls runoff and erosion is essential.

The suitability of this soil for pasture is limited. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Reseeding pastures is difficult because of the slope. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for northern red oak is moderate. The use of logging equipment is limited by the slope. The hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope and frost action are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems reduces the potential for frost action.

The slope and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste

disposal systems are installed. Extensive land modification is needed to overcome the slope.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIe.

ChF—Chadakoin silt loam, 35 to 50 percent slopes. This soil is very steep, very deep, and well drained. It is on hillsides and valley sides that receive runoff from the higher adjacent soils. Many areas on the valley sides are deeply dissected by V-shaped gullies. Individual areas are elongated or occur as narrow strips on the side slopes. They commonly are 20 to 75 acres in size but range from 10 to several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 4 inches; dark grayish brown silt loam

Subsoil:
4 to 13 inches; yellowish brown, friable silt loam
13 to 24 inches; dark yellowish brown, friable silt loam; 10 percent gravel
24 to 43 inches; dark yellowish brown, friable gravelly loam; 20 percent gravel

Substratum:
43 to 72 inches; dark brown, friable gravelly loam; 30 percent gravel

Included in mapping are small areas of Schuyler soils, which have more clay in the subsoil than the Chadakoin soil; Towerville soils, which have bedrock within a depth of 40 inches; and soils that have a channery surface layer. Also included are narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 20 to 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow in the lower part of the subsoil and in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of 3 to 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used as woodland. A small acreage is idle land.

This soil is not suited to cultivated crops, hay, or pasture. The slope and the very severe hazard of erosion are the main management concerns. The soil is too steep for the safe operation of farm machinery. A plant cover that controls runoff and erosion is essential.

The potential productivity of this soil for northern red oak is moderate. The use of logging equipment is limited by the slope and the hazard of erosion. The seedling mortality rate is low, and the hazard of windthrow is slight. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

The slope severely limits construction. It is the main limitation on sites for local roads and streets, dwellings with basements, and waste disposal systems. Erosion is a very severe hazard on construction sites. In most areas the native plant cover should not be removed.

The capability subclass is VIIe.

CkB—Chautauqua silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on convex hilltops and small knolls that receive little or no runoff from the higher adjacent soils. Individual areas are oblong or irregularly shaped. They commonly range from 5 to 50 acres in size, but some are as large as several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 22 inches; dark yellowish brown, friable silt loam
22 to 34 inches; brown, mottled, firm gravelly silt loam; 45 percent gravel

Substratum:
34 to 60 inches; dark yellowish brown, friable very gravelly loam; 30 percent gravel
60 to 72 inches; dark yellowish brown, friable very gravelly loam; 45 percent gravel

Included in mapping are small areas of the somewhat poorly drained Busti soils along drainageways and in wet spots; the well drained Chadakoin soils in the slightly higher positions on the landscape; the moderately well drained Langford soils, which have a fragipan in the subsoil; and Chautauqua soils that have a gravelly surface layer. Included areas make up about 20 to 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum

Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and strongly acid to slightly acid in the subsoil and substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.0 feet from November through April
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming. Some of the acreage is woodland or is idle land that is reverting to brush and shrubs. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county. The seasonal wetness delays planting for a short period in spring, but the soil can be easily worked after it has dried. Surface or tile drains commonly are needed so that the fields can be farmed more uniformly. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Measures that maintain tilth, increase the content of organic matter, and control erosion include tilling only when the soil is at the proper moisture content, incorporating crop residue into the soil, and growing cover crops. Minimizing tillage, farming on the contour, and stripcropping help to control erosion on long slopes. If wet spots are adequately drained and field drainageways are provided, the soil is well suited to many crops, particularly corn, small grain, and hay.

This soil is well suited to pasture. Overgrazing is a major concern in managing pasture because it can damage the pasture plants. Grazing when the soil is wet in spring can result in compaction and can damage the pasture. Topdressing with lime and fertilizer, using proper stocking rates, rotating livestock grazing, controlling weeds and brush by mowing annually, and deferring grazing when the soil is wet help to maintain high-quality pasture.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The perched seasonal high water table is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

This soil is subject to erosion if the plant cover is removed during construction.

The capability subclass is IIw.

CkC—Chautauqua silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and moderately well drained. It is on hillsides and side slopes that receive runoff from the higher adjacent soils. Individual areas are rectangular and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 22 inches; dark yellowish brown, friable silt loam
22 to 34 inches; brown, mottled, firm gravelly silt loam; 45 percent gravel

Substratum:
34 to 60 inches; dark yellowish brown, friable very gravelly loam; 30 percent gravel
60 to 72 inches; dark yellowish brown, friable very gravelly loam; 45 percent gravel

Included in mapping are small areas of the somewhat poorly drained Busti soils along drainageways and in seepage spots; the well drained Chadakoin soils in the slightly higher positions on the landscape; the moderately well drained Langford soils, which have a fragipan in the subsoil; and the moderately well drained Schuyler soils, which have more clay in the subsoil than the Chautauqua soil. Also included are spots of Chautauqua soils that have a gravelly surface layer. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum

Figure 7.—Stripcropping helps to control erosion in this area of Chautauqua silt loam, 8 to 15 percent slopes.

Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and strongly acid to slightly acid in the subsoil and substratum
Surface runoff: Moderately rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 1.5 to 2.0 feet from November through April
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming. Some of the acreage is woodland or is idle land that is reverting to woodland.

This soil is moderately well suited to cultivated crops. If wet spots are adequately drained and field drainageways are provided, the soil can be used for many crops, particularly corn, small grain, and hay. The seasonal wetness delays planting for a short period in spring, but the soil can be easily worked after it has dried. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a serious hazard on long slopes and in intensively cultivated areas. Contour farming and stripcropping in combination with diversions or grassed waterways help to control erosion (fig. 7). Incorporating crop residue into the soil, rotating crops, minimizing tillage, and growing cover crops help to maintain tilth, control erosion, and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing is a major concern in managing pasture because it can damage the pasture plants and increase the hazard of erosion. Grazing when the soil is wet in spring can result in compaction and can damage the pasture. Topdressing with lime and fertilizer, using proper stocking rates, rotating livestock grazing, controlling weeds and brush by mowing annually, and deferring grazing when the soil is wet help to maintain high-quality pasture.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards

of erosion and windthrow are slight. The seedling mortality rate commonly is low. Seedlings should be planted early in spring, when the soil is moist.

The perched seasonal high water table and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Also, installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings. Land grading and shaping help to overcome the slope.

Frost action, the seasonal wetness, and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems reduces the wetness and the potential for frost action.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

CkD—Chautauqua silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and moderately well drained. It is on smooth hillsides and valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 15 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 22 inches; dark yellowish brown, friable silt loam
22 to 34 inches; brown, mottled, firm gravelly silt loam; 45 percent gravel

Substratum:
34 to 60 inches; dark yellowish brown, friable very gravelly loam; 30 percent gravel
60 to 72 inches; dark yellowish brown, friable very gravelly loam; 45 percent gravel

Included in mapping are small areas of the somewhat poorly drained Busti soils; the well drained Chadakoin soils; Schuyler soils, which have more clay in the subsoil than the Chautauqua soil; Langford soils, which have a fragipan in the subsoil; and Chautauqua soils that have a gravelly surface layer. Also included are a few springs, which are identified on the soil maps by a special symbol. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and strongly acid to slightly acid in the subsoil and substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1.5 to 2.0 feet from November through April
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay or pasture. A small acreage is used for row crops.

This soil is poorly suited to cultivated crops because of the severe hazard of erosion and the slope, which limits the use of farm machinery. Erosion is a hazard in cultivated areas. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, tilling on the contour, stripcropping, and frequently including grasses and legumes in the cropping system help to maintain good tilth, increase the content of organic matter, and control erosion. Liberal applications of lime and fertilizer are needed to maintain crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes can be grown, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. If plowing is necessary to establish a plant cover, plowing across the slope and leaving strips of sod help to control runoff. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The use of logging equipment is limited by the slope. The hazards of erosion and windthrow are

slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The seasonal wetness and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Also, installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings. Land grading and shaping help to overcome the slope.

Frost action, the seasonal wetness, and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems reduces the wetness and the potential for frost action.

The seasonal wetness, the restricted permeability in the substratum, and the slope are the main limitations on sites for septic tank absorption fields. Extensive land modification is needed if onsite waste disposal systems are installed. Installing a subsurface drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

ClA—Chenango silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained or somewhat excessively drained. It is on silty outwash plains and stream terraces. Individual areas are rectangular or oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; brown silt loam

Subsoil:
9 to 14 inches; yellowish brown, friable silt loam
14 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, very friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions, moderately well drained soils along drainageways, and soils that have a sandy or gravelly surface layer. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Scattered woodlots are in a few areas. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It can be cultivated early in spring and can be used intensively for row crops. Deep-rooted perennial crops, such as alfalfa, grow especially well. Crops respond well to frequent applications of lime and fertilizer. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the soil, growing cover crops and occasional sod crops, and minimizing tillage. The soil generally can be easily kept in good tilth. Droughtiness is a limitation in some dry years. Mulching conserves moisture.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Plant growth may be limited in midsummer. As a result, care is needed to prevent overgrazing during this period. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Removing the mantle of silty material and backfilling with coarse textured base material reduce the potential for frost action.

This soil is suited to septic tank absorption fields, but care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

If the silty overburden is removed, this soil is a good source of sand and gravel. Some areas are excellent sites for athletic fields or other recreational uses that require a nearly level, stone-free site.

The capability class is I.

ClB—Chenango silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained or somewhat excessively drained. It is on silty outwash plains and stream terraces. Individual areas are rectangular or oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; brown silt loam

Subsoil:
9 to 14 inches; yellowish brown, friable silt loam
14 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, very friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions, moderately well drained soils along drainageways, and soils that have a sandy or gravelly surface layer. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Scattered woodlots are in a few areas. This soil meets the requirements for prime farmland.

This soil is well suited to all of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted perennial crops, such as alfalfa, grow especially well. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard if the soil is intensively cultivated and is not protected by a plant cover. Incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and control erosion. Farming on the contour and stripcropping help to control erosion and conserve water during the growing season. Droughtiness can hinder crop growth in some years.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Removing the mantle of silty material and backfilling with coarse textured base material reduce the potential for frost action.

This soil is suited to septic tank absorption fields, but care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

If the silty overburden is removed, this soil is a good source of sand and gravel.

The capability subclass is IIe.

CnA—Chenango gravelly loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained to excessively drained. It is on outwash plains, beach ridges, and stream terraces. Individual areas are elongated or irregularly shaped. They commonly range from 5 to 50 acres in size, but some are as large as several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown gravelly loam

Subsoil:
6 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along the fringes of valleys and small areas of soils that have a surface layer of sandy material or silt loam. Also included are silty, well drained soils in areas where the Chenango soil adjoins Allard soils. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Scattered woodlots are in a few areas. Areas on lake plains are used for vegetables, small fruit, orchards, or vineyards. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It can be cultivated early in spring and can be used intensively for row crops. Droughtiness and small rock fragments on the surface are the main limitations. The rock fragments can interfere with the planting of some fine-seeded crops and can increase the wear on machinery. Deep-rooted perennial crops, such as alfalfa, grow especially well. Crops respond well to frequent applications of lime and fertilizer. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and rotating crops improve tilth and help to maintain the content of organic matter. Increasing the content of organic matter improves the available water capacity of the soil.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Plant growth may be limited in midsummer. As a result, care is needed to prevent overgrazing during this period. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Removing the mantle of silty material and backfilling with coarse textured base material reduce the potential for frost action.

If this soil is used as a site for septic tank absorption fields, care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

This soil is a good source of sand and gravel.

The capability subclass is IIs.

CnB—Chenango gravelly loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained to excessively drained. It is on outwash plains, beach ridges, and stream terraces. Individual areas are elongated or irregularly shaped. They commonly range from 5 to 50 acres in size, but some are as large as several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown gravelly loam

Subsoil:
6 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along the fringes of valleys and small areas of soils that have a surface layer of sandy material or silt loam. Also included are silty, well drained soils in areas where the Chenango soil adjoins Allard soils. Included areas make up about 15 to 20 percent of this unit.

Figure 8.—A vineyard in an area of Chenango gravelly loam, 3 to 8 percent slopes.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Scattered woodlots are in a few areas. Areas on lake plains are used for vegetables, small fruit, orchards, or vineyards (fig. 8). This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It can be cultivated early in spring and can be used intensively for row crops. Droughtiness and small rock fragments on the surface are the main limitations. The rock fragments can interfere with the planting of some fine-seeded crops and can increase the wear on machinery. Deep-rooted perennial crops, such as alfalfa, grow especially well. Crops respond well to frequent applications of lime and fertilizer. Erosion is a hazard on long slopes if the soil is intensively cultivated and is not protected by a plant

cover. Incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and control erosion. Farming on the contour and stripcropping help to control erosion and conserve water during the growing season.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Plant growth may be limited in midsummer. As a result, care is needed to prevent overgrazing during this period. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Removing the surface layer and adding coarse textured base material reduce the potential for frost action.

If this soil is used as a site for septic tank absorption fields, care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

This soil is a good source of sand and gravel.

The capability subclass is IIs.

CnC—Chenango gravelly loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained to excessively drained. It is on rolling outwash plains, beach ridges, and stream terraces. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown gravelly loam

Subsoil:
6 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along drainageways. Also included are Valois soils and soils that have a surface layer of sandy material or silt loam. Valois soils are in areas where the Chenango soil adjoins areas of glacial till. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Moderately rapid
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay or for row crops grown in support of dairy farming. Some areas on lake plains are used for orchards, small fruit, or vineyards. Scattered woodlots are in some areas, and some of the acreage is idle land.

This soil is moderately well suited to most of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted perennial crops, such as alfalfa, grow especially well. The slope, erosion, droughtiness, and stones and gravel on the surface are the main limitations. The gravel may interfere with the planting of some crops and cause excessive wear on machinery. Erosion is a serious hazard on long slopes and in intensively cultivated areas. Farming on the contour, stripcropping, and establishing grassed waterways help to control erosion. Incorporating crop residue into the soil, minimizing tillage, growing cover crops, and including sod crops in the cropping sequence help to maintain tilth and reduce the hazard of erosion. These practices also increase the content of organic matter and thus improve the available water capacity of the soil. Crops respond well to applications of lime and fertilizer. Legumes respond especially well. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth, especially during dry periods, and can increase the hazard of erosion. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are important management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation.

Frost action and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems reduces the potential for frost action.

If this soil is used as a site for septic tank absorption fields, care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

This soil is a good source of sand and gravel.

The capability subclass is IIIe.

CnD—Chenango gravelly loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained to excessively drained. It is on hilly outwash plains, on terrace fronts, and on dissected deltas. Individual areas are irregular in shape and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown gravelly loam

Subsoil:
6 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel
27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:
45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the less sloping Chenango soils. Also included are Valois soils and soils that have a surface layer of sandy material or silt loam. Valois soils are in areas where the Chenango soil adjoins areas of glacial till. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay, pasture, or row crops.

This soil is poorly suited to cultivated crops. The slope, the hazard of erosion, and droughtiness are the main management concerns. Operating farm equipment is difficult and hazardous because of the slope. Erosion is a serious hazard in cultivated areas. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, tilling across the slope, stripcropping, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and minimize erosion. Liberal applications of lime and fertilizer are needed to maintain crop growth. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes can be grown, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. If plowing is necessary to establish a plant cover, plowing across the slope and leaving strips of sod help to control runoff. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush by mowing annually are important management needs.

The potential productivity of this soil for sugar maple is moderate. The use of equipment is restricted by the slope. The hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope is the main limitation on sites for local roads and streets. Land grading and building on the contour help to overcome this limitation.

The rapid permeability and the slope are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed.

Extensive land modification is needed to overcome the slope. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

CnE—Chenango gravelly loam, 25 to 40 percent slopes. This soil is steep, very deep, and well drained to excessively drained. It is on terrace fronts, the sides of ridges, and the side slopes of dissected outwash plains. Individual areas are oblong or occur as narrow strips on the side slopes. They range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; brown gravelly loam

Subsoil:

6 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel

27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:

45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the well drained Chadakoin and Valois soils, which formed in glacial till. Also included are narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 15 to 25 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum

Available water capacity: Moderate or low

Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum

Surface runoff: Rapid

Hazard of erosion: Very severe

Water table: At a depth of more than 6 feet

Flooding: None

Depth to bedrock: More than 6 feet

Most areas are used as woodland and wildlife habitat. Some of the acreage is idle land or is used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm equipment is very difficult and hazardous because of the slope. A plant cover is needed to control runoff.

The suitability of this soil for pasture is limited. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for northern red oak is moderate. The use of logging equipment is limited by the slope. The hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope is the main limitation on sites for local roads and streets. Land grading and building on the contour help to overcome this limitation.

The rapid permeability and the slope are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIe.

CoA—Chenango channery loam, fan, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained to excessively drained. It is on alluvial fans and remnant deltas. Individual areas are essentially triangular or fan shaped. They commonly are 5 to 20 acres in size but range from 5 to 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; brown channery silt loam; 25 percent channery fragments

Subsoil:

9 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel

27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:

45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils near the lower margin of the fans. Also included are small areas of the moderately well drained Middlebury soils and small areas of Chenango soils that have a gravelly surface layer. Middlebury soils are in areas where the alluvial fans adjoin silty soils on alluvial flood plains. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 3 to 6 feet from April through May
Flooding: Rare
Depth to bedrock: More than 6 feet

Most areas are used for the crops that commonly are grown in support of dairy farming, such as corn, oats, and alfalfa. Small woodlots are in some areas, and some of the acreage is idle land or is used as pasture. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It can be cultivated early in spring and can be used intensively for row crops. The rare flooding, droughtiness, and small stones in the soil are the main limitations affecting crop production. The flooding usually occurs early in spring, before crops are planted. The stones can interfere with planting and can cause excessive wear on machinery. Deep-rooted perennial crops, such as alfalfa, grow especially well. Crops respond well to frequent applications of lime and fertilizer. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and rotating crops improve tilth and help to maintain the content of organic matter. Increasing the content of organic matter improves the available water capacity of the soil.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Plant growth may be limited in midsummer. As a result, care is needed to prevent overgrazing during this period. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

The main management concerns on sites for dwellings with basements are the hazard of flooding and slight wetness in the substratum early in spring. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the hazard of flooding are the main management concerns on sites for local roads and streets. Building on raised fill material reduces the hazard of flooding and the potential for frost action.

The seasonal wetness and the rapid permeability are the main limitations on sites for septic tank absorption fields. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

This soil is a good source of roadfill.

The capability subclass is IIs.

CoB—Chenango channery loam, fan, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained to excessively drained. It is on alluvial fans and remnant deltas. Individual areas are essentially triangular or fan shaped. They commonly are 5 to 20 acres in size but range from 5 to 50 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; brown channery silt loam; 25 percent channery fragments

Subsoil:

9 to 27 inches; yellowish brown, friable gravelly silt loam; 30 percent gravel

27 to 45 inches; yellowish brown, friable very gravelly fine sandy loam; 45 percent gravel

Substratum:

45 to 72 inches; brown very gravelly loamy sand; 55 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils near the lower margin of the fans. Also included are small areas of the moderately well drained Middlebury soils and small areas of Chenango soils that have a gravelly surface layer. Middlebury soils are in areas where the alluvial fans adjoin silty soils on alluvial flood plains. Included areas make up about 25 percent of this unit.

Figure 9.—Corn in an area of Chenango channery loam, fan, 3 to 8 percent slopes. This soil is considered prime farmland, but the stones on the surface can interfere with tillage.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate or low
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 3 to 6 feet from April through May
Flooding: Rare
Depth to bedrock: More than 6 feet

Most areas are used for the crops that commonly are grown in support of dairy farming, such as corn, oats, and alfalfa (fig. 9). Small woodlots are in some areas, and some of the acreage is idle land or is used as pasture. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It can be cultivated early in spring and can be used intensively for row crops. The rare flooding, droughtiness, and small stones in the soil are the main limitations affecting crop production. The flooding usually occurs early in spring, before crops are planted. The stones can interfere with planting and can cause excessive wear on machinery. Deep-rooted perennial crops, such as alfalfa, grow especially well.

Crops respond well to frequent applications of lime and fertilizer. Erosion is a hazard on long slopes if the soil is intensively cultivated and is not protected by a plant cover. Incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and control erosion. Farming on the contour and stripcropping help to control erosion and conserve water during the growing season.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Plant growth may be limited in midsummer. As a result, care is needed to prevent overgrazing during this period. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is wet.

The main management concerns on sites for dwellings with basements are the hazard of flooding and slight wetness in the substratum early in spring. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the hazard of flooding are the main management concerns on sites for local roads and streets. Building on raised fill material reduces the hazard of flooding and the potential for frost action.

The seasonal wetness and the rapid permeability are the main limitations on sites for septic tank absorption fields. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

This soil is a good source of roadfill.

The capability subclass is IIs.

CpA—Churchville silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on broad flats on lowland till plains and on the lower side slopes of valleys that receive runoff from the higher adjacent soils. Individual areas are oblong or irregularly shaped and range from 5 to 75 acres in size. Slopes are smooth.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches; dark grayish brown silt loam

Subsurface layer:

7 to 10 inches; light brownish gray, mottled, friable silty clay loam

Subsoil:

10 to 19 inches; yellowish brown, mottled, firm silty clay loam

19 to 33 inches; brown, mottled, firm silty clay loam

Substratum:

33 to 72 inches; brown, mottled, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of poorly drained soils along drainageways; the somewhat poorly drained Darien soils, which do not have a clayey mantle; and the somewhat poorly drained Rhinebeck soils, which formed in clayey deposits thicker than those of the Churchville soil. Also included, on lake plains, are areas of Barcelona soils, which have bedrock at a depth of 40 to 60 inches. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum

Available water capacity: High

Soil reaction: Moderately acid to neutral in the surface layer and subsurface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum

Surface runoff: Slow

Hazard of erosion: Slight

Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May

Flooding: None

Depth to bedrock: More than 6 feet

Most of the acreage is used for hay or pasture or is idle land. Some areas are used for cultivated crops. Areas on lake plains are used for vegetables or vineyards. A small acreage is wooded.

This soil is moderately well suited to cultivated crops, but the seasonal wetness delays planting in spring and makes harvesting difficult in fall. Crops in slightly depressional areas are damaged during prolonged wet periods. The soil is subject to puddling and compaction if it is tilled when wet. If drained, it is suited to many of the crops commonly grown in the county. Tile drains generally should be closely spaced because of the slowly permeable, clayey subsoil. Tilling only when the soil is at the proper moisture content minimizes crusting and clodding. Growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and minimize crusting and clodding.

This soil is well suited to hay and pasture. Using proper stocking rates, rotating livestock grazing,

controlling weeds and brush, deferring grazing when the soil is wet, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate commonly is low because of the high available water capacity of the soil.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

This soil is a good source of topsoil. If the silty overburden is removed, it also is a good source of sand and gravel. Some areas are excellent sites for athletic fields or other recreational uses that require a nearly level, stone-free site.

The capability subclass is IIIw.

CpB—Churchville silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on the lower side slopes of valleys that receive runoff from the higher adjacent soils. Individual areas are oblong or irregularly shaped. They commonly range from 5 to 40 acres in size, but some are as large as 200 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsurface layer:
7 to 10 inches; light brownish gray, mottled, friable silty clay loam

Subsoil:
10 to 19 inches; yellowish brown, mottled, firm silty clay loam
19 to 33 inches; brown, mottled, firm silty clay loam

Substratum:
33 to 72 inches; brown, mottled, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of soils that are similar to the Churchville soil but are poorly drained and are along drainageways; the somewhat poorly drained Darien soils, which do not have a clayey mantle; and the somewhat poorly drained Rhinebeck soils, which formed in clayey deposits thicker than those of the Churchville soil. Also included, on lake plains, are small areas of Barcelona soils, which have bedrock at a depth of 40 to 60 inches. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer and subsurface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is hayland, pasture, woodland, or idle land. Some areas are used for cultivated crops. Areas on lake plains are used for vegetables or vineyards.

This soil is moderately well suited to cultivated crops. The seasonal wetness delays planting in spring and makes harvesting difficult in fall. Erosion is a hazard in intensively cultivated areas where slopes are long. Interceptor drains can divert runoff and subsurface seepage from the higher adjacent soils and thus reduce the hazard of erosion. Tile drains generally should be closely spaced because of the slowly permeable, clayey subsoil. Tilling only when the soil is at the proper moisture content minimizes surface crusting and clodding. Growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and minimize crusting and clodding. These practices, along with farming on the contour and stripcropping, also reduce the hazard of erosion.

This soil is suited to water-tolerant hay species and to grazing late in spring. Grazing when the soil is wet is the main management concern. It results in surface compaction, restricts plant growth, damages pasture grasses, and increases the hazard of erosion. Using proper stocking rates, rotating livestock grazing, restricting grazing when the soil is wet, and controlling brush and weeds by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The use of equipment is somewhat limited by the seasonal wetness. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness. The hazard of erosion is slight, and the seedling mortality rate is low. The trees that can withstand the seasonal wetness grow best.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Installing roadside drainage systems and building on raised fill material help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

Compacting this soil after it has been disturbed commonly is difficult because of the content of clay. Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIw.

CpC—Churchville silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on the lower side slopes of valleys that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsurface layer:
7 to 10 inches; light brownish gray, mottled, friable silty clay loam

Subsoil:
10 to 19 inches; yellowish brown, mottled, firm silty clay loam
19 to 33 inches; brown, mottled, firm silty clay loam

Substratum:
33 to 72 inches; brown, mottled, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of soils that are similar to the Churchville soil but are poorly drained and are in seepage spots on foot slopes and along drainageways; the somewhat poorly drained Darien soils, which do not have a clayey mantle; and Rhinebeck soils, which formed in clayey deposits thicker than those of the Churchville soil. Also included, on lake plains, are small areas of Barcelona soils, which have bedrock at a depth of 40 to 60 inches. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer and subsurface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Severe
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used as hayland, pasture, or woodland. Some of the acreage is used for cultivated crops or is idle land.

This soil is moderately well suited to cultivated crops, but erosion is a serious hazard in some areas, particularly on long slopes. The seasonal wetness may delay tillage in spring and harvesting in fall. Interceptor drains can divert runoff and seepage from the higher adjacent soils and thus reduce the hazard of erosion. Plowing only when the soil is at the proper moisture content minimizes surface crusting and clodding. Growing cover crops, incorporating crop residue into the soil, minimizing tillage, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and minimize crusting and clodding. Together with farming on the contour and stripcropping, these practices also reduce the hazard of erosion.

This soil is suited to hay and to late-spring pasture. Grazing when the soil is wet damages the pasture. If the plant cover deteriorates as a result of overgrazing, erosion is a serious hazard. Using proper stocking rates, rotating livestock grazing, deferring grazing when

the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is moderate, and the use of logging equipment is somewhat limited by the seasonal wetness. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness. The seedling mortality rate is low. The trees that can withstand the seasonal wetness grow best. Building logging roads and skid trails on the contour reduces the hazards of erosion and gullying.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Installing roadside drainage systems and building on raised fill material help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

Compacting this soil after it has been disturbed commonly is difficult because of the content of clay. Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

CsB—Collamer silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is on the higher knolls and convex shoulder slopes of drainageways on lowland lake plains. Individual areas are oblong or circular and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsurface layer:
7 to 16 inches; yellowish brown, friable silt loam

Subsoil:
16 to 21 inches; brown and yellowish brown, mottled, firm silt loam
21 to 38 inches; brown, mottled, firm silt loam
38 to 45 inches; brown, mottled, firm silty clay loam

Substratum:
45 to 72 inches; dark brown, firm silt loam

Included in mapping are small areas of the somewhat poorly drained Niagara soils along drainageways, the poorly drained Canandaigua soils in slight depressions, and the well drained Dunkirk soils on the higher knolls. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow or moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and slightly acid or moderately acid in the substratum
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: At a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for vegetables, orchards, or vineyards. Small, scattered woodlots are in some areas, and some of the acreage is used for hay or pasture or is idle land. This soil meets the requirements for prime farmland.

This soil is moderately well suited to most of the crops commonly grown in the county. It is especially well suited to vegetables, but planting may be delayed because of the seasonal wetness. Draining wet spots permits earlier tillage of many fields. The soil commonly has no stones and can be easily tilled. It is highly erodible in cultivated areas, especially where slopes are long. Measures that minimize surface crusting and compaction and reduce the hazard of erosion are needed. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter. Farming on the contour, minimizing tillage, stripcropping, and maintaining a year-round plant cover help to control erosion.

This soil is suited to pasture. Prevention of overgrazing and restricted grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pastures and results in erosion.

Grazing when the soil is wet seals the surface and compacts the soil. Using proper stocking rates, rotating livestock grazing, and controlling weeds by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Installing roadside drainage systems and building on raised fill material help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

This soil is a good source of topsoil.

The capability subclass is IIe.

CsC—Collamer silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and moderately well drained. It is on ridges and the side slopes along drainageways on lowland lake plains. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsurface layer:
7 to 16 inches; yellowish brown, friable silt loam

Subsoil:
16 to 21 inches; brown and yellowish brown, mottled, firm silt loam
21 to 38 inches; brown, mottled, firm silt loam
38 to 45 inches; brown, mottled, firm silty clay loam

Substratum:
45 to 72 inches; dark brown, firm silt loam

Included in mapping are small areas of the somewhat poorly drained Niagara soils along drainageways, the poorly drained Canandaigua soils in slight depressions and in seepage spots, and the well drained Dunkirk soils. Included areas make up about 20 to 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow or moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and slightly acid or moderately acid in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Many areas are used as hayland, pasture, or woodland. Some of the acreage is used for cultivated crops grown in support of dairy farming or is idle land.

This soil is moderately well suited to most of the crops commonly grown in the county. Erosion is a hazard where cultivated crops are grown. Planting may be delayed by wetness in spring. Draining wet spots permits earlier tillage of many fields. The soil commonly has no stones and can be easily tilled. Measures that minimize surface crusting and compaction and reduce the hazard of erosion are needed. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter. Farming on the contour, minimizing tillage, stripcropping, and maintaining a year-round plant cover help to control erosion.

This soil is suited to pasture. Prevention of overgrazing and restricted grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pastures and results in erosion. Grazing when the soil is wet seals the surface and compacts the soil. Using proper stocking rates, rotating livestock grazing, and controlling weeds by mowing annually are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of windthrow are slight. The hazard of erosion is moderate. Building logging roads and skid trails across

the slope helps to control erosion and minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Installing roadside drainage systems and building on raised fill material help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a serious hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

CvB—Colonie loamy fine sand, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained to excessively drained. It is in undulating areas on lowland lake plains and along valley sides. Individual areas are oblong or irregularly shaped and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; dark grayish brown loamy fine sand

Subsoil:

9 to 22 inches; strong brown, very friable loamy fine sand

22 to 29 inches; yellowish brown, very friable loamy fine sand

29 to 45 inches; yellowish brown, very friable loamy fine sand that has thin bands of fine sandy loam

Substratum:

45 to 72 inches; brown fine sand

Included in mapping are small areas of the moderately well drained Elnora soils along drainageways, the somewhat poorly drained Minoa soils in slight depressions, and soils that have a surface layer of fine sandy loam or have a gravelly surface layer. Included areas make up about 20 to 25 percent of this unit.

Soil properties—

Permeability: Moderately rapid or rapid throughout the profile
Available water capacity: Low
Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and moderately acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. Crop growth is restricted, however, by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Water erosion is a minor hazard on long slopes and where the soil is intensively cultivated. Wind erosion is a hazard in areas where the plant cover has been removed. Minimizing tillage, growing cover crops, adding animal waste to the soil, incorporating crop residue into the soil, and including sod crops in the cropping system increase the content of organic matter and help to maintain tilth.

Because of a very low content of organic matter, droughtiness, and the sandy texture, this soil is only moderately well suited to hay and pasture. Some areas can be used for early season pasture, but plant growth commonly is limited by midsummer. Overgrazing in summer can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

This soil has few limitations as a site for dwellings with basements and for local roads and streets. If the

soil is used as a site for septic tank absorption fields, care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum. Because the soil is loose, the sides of excavations or cuts tend to slough or slump.

The capability subclass is IIs.

CvC—Colonie loamy fine sand, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained to excessively drained. It is on side slopes in dissected areas on lowland lake plains and along valley sides. Individual areas are oblong and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown loamy fine sand

Subsoil:
9 to 22 inches; strong brown, very friable loamy fine sand
22 to 29 inches; yellowish brown, very friable loamy fine sand
29 to 45 inches; yellowish brown, very friable loamy fine sand that has thin bands of fine sandy loam

Substratum:
45 to 72 inches; brown fine sand

Included in mapping are small areas of the moderately well drained Elnora soils along drainageways, the somewhat poorly drained Minoa soils in slight depressions, and soils that have a surface layer of fine sandy loam or have a gravelly surface layer. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderately rapid or rapid throughout the profile
Available water capacity: Low
Soil reaction: Strongly acid to slightly acid in the surface layer and subsoil and moderately acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas.

This soil is only moderately well suited to cultivated crops because of the slope, droughtiness in midsummer, and low natural fertility. Water erosion is a hazard, particularly on long slopes and in intensively cultivated areas. Wind erosion is a hazard in areas where the plant cover has been removed. This stone-free soil generally can be easily tilled. Minimizing tillage, growing cover crops, adding animal waste to the soil, incorporating crop residue into the soil, and including sod crops in the cropping system increase the content of organic mater and help to maintain tilth. Farming on the contour and stripcropping help to control erosion and increase the supply of moisture in the soil.

Because of a very low content of organic matter, droughtiness, and the sandy texture, this soil is only moderately well suited to hay and pasture. Some areas can be used for early season pasture, but plant growth commonly is limited by midsummer. Overgrazing in summer can deplete the stand of pasture grasses and increase the hazard of erosion. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The slope is the main limitation on sites for dwellings with basements and for local roads and streets. Land grading and shaping help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum. Because the soil is loose, the sides of excavations or cuts tend to slough or slump.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

DaA—Dalton silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on the top of hills in the uplands and on broad flats on till plains. Individual areas are oblong or irregularly shaped. They commonly range from 10 to 50 acres in size, but some are as large as 100 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown silt loam

Subsoil:

9 to 14 inches; brown, mottled, friable silt loam

14 to 23 inches; light brownish gray, mottled, friable silt loam

23 to 46 inches; a fragipan of brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:

46 to 72 inches; olive brown, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions, the moderately well drained Canaseraga soils on slight rises and knolls, and soils having a silty mantle that is less than 20 inches thick. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow or very slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer, strongly acid to neutral in the fragipan, and slightly acid or neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the acreage is woodland or idle land.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If a drainage system is installed, the soil is suited to most of the crops commonly grown in the county. Wetness can be reduced by closely spaced tile and open-ditch drainage systems. The soil commonly does not have stones on the surface and can be easily cultivated. Crops respond well to liberal applications of lime and fertilizer. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damages the pasture. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, topdressing with lime and fertilizer, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is slight. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness and the fragipan.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

DaB—Dalton silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on the top of hills in the uplands and on broad flats on till plains. It receives some runoff from the higher adjacent soils. Individual areas are oblong or irregularly shaped and commonly range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; very dark grayish brown silt loam

Subsoil:

9 to 14 inches; brown, mottled, friable silt loam

14 to 23 inches; light brownish gray, mottled, friable silt loam

23 to 46 inches; a fragipan of brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:

46 to 72 inches; olive brown, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of poorly drained soils along drainageways and in slight

depressions, the moderately well drained Canaseraga soils on slight rises and knolls, and soils having a silty mantle that is less than 20 inches thick. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow or very slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer, strongly acid to neutral in the fragipan, and slightly acid or neutral in the substratum
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the acreage is woodland or idle land.

This soil is moderately well suited to cultivated crops. Undrained areas are better suited to short-season crops and to hay and pasture. Wetness delays tillage in spring and makes harvesting difficult in fall. If drained and protected from erosion, the soil is suited to most of the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter. The soil commonly does not have stones on the surface and can be easily cultivated. Crops respond well to liberal applications of lime and fertilizer.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damages the pasture. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, topdressing with lime and fertilizer, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness and the fragipan.

The seasonal wetness and the restricted permeability in the subsoil and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

This soil is subject to erosion if the plant cover is removed during construction.

The capability subclass is IIIw.

DeA—Darien silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on flat benches and broad till plains. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown silt loam

Subsurface layer:
9 to 14 inches; grayish brown, mottled, friable silt loam

Subsoil:
14 to 21 inches; brown, mottled, friable silt loam
21 to 31 inches; dark yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel

Substratum:
31 to 72 inches; dark yellowish brown, firm gravelly silt loam; 15 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Erie soils, which have a fragipan; and Fremont soils, which are more acid than the Darien soil. Also included are small areas of soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer, moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil; slightly acid or neutral in the lower part of the subsoil; and mildly alkaline or moderately alkaline in the substratum
Surface runoff: Slow

Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the acreage is woodland or idle land. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Darien soils. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Wetness can be reduced by closely spaced tile and open-ditch drainage systems. Maintaining good tilth is a management concern in intensively cultivated areas. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damages the pasture. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

DeB—Darien silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on hilltops, broad till plains, and valley toe slopes that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown silt loam

Subsurface layer:
9 to 14 inches; grayish brown, mottled, friable silt loam

Subsoil:
14 to 21 inches; brown, mottled, friable silt loam
21 to 31 inches; dark yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel

Substratum:
31 to 72 inches; dark yellowish brown, firm gravelly silt loam; 15 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Erie soils, which have a fragipan; and Fremont soils, which are more acid than the Darien soil. Also included are small areas of soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer, moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil; slightly acid or neutral in the lower part of the subsoil; and mildly alkaline or moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the

acreage is woodland or idle land. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus increase the hazard of erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

DeC—Darien silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on hillsides and valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown silt loam

Subsurface layer:
9 to 14 inches; grayish brown, mottled, friable silt loam

Subsoil:
14 to 21 inches; brown, mottled, friable silt loam
21 to 31 inches; dark yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel

Substratum:
31 to 72 inches; dark yellowish brown, firm gravelly silt loam; 15 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in seepage spots, in slight depressions, and along drainageways; Erie soils, which have a fragipan; and Fremont soils, which are more acid than the Darien soil. Also included are small areas of soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer, moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral in the surface layer, the subsurface layer, and the upper part of the subsoil; slightly acid or neutral in the lower part of the subsoil; and mildly alkaline or moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for hay, pasture, or cultivated crops grown in support of dairy farming. Some of the acreage is woodland or idle land.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to most of the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, depletes the stand of pasture grasses, and increases the hazard of erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIe.

DkD—Dunkirk silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on dissected valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 15 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown silt loam

Subsurface layer:
6 to 12 inches; pale brown, friable silt loam

Subsoil:
12 to 21 inches; yellowish brown, friable silt loam
21 to 29 inches; yellowish brown, firm silty clay loam
29 to 38 inches; brown, firm silty clay loam

Substratum:
38 to 45 inches; brown, firm silty clay loam
45 to 72 inches; brown silt and clay

Included in mapping are small areas of the well drained Unadilla soils, which have less clay in the subsoil than the Dunkirk soil, and soils that have a surface layer of very fine sandy loam or gravelly silt loam. Also included are a few wet spots and drainageways, which are identified on the soil maps by special symbols. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to moderately alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or idle land. Some areas are used for hay or pasture, and a few areas are used as cropland.

This soil is poorly suited to cultivated crops because of the slope and the very severe hazard of erosion. Operating farm equipment is difficult and hazardous because of the slope. Erosion is a serious hazard in cultivated areas. Cultivated crops should be grown only

occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, tilling across the slope, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and reduce the hazard of erosion.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing and grazing when the soil is wet are the main management concerns. Grazing when the soil is wet damages the pasture. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes can be grown on this soil. If plowing is necessary to establish a plant cover, plowing across the slope and leaving strips of sod help to control runoff. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, and controlling brush and weeds are the main management needs.

The potential productivity of this soil for American basswood is moderate. The use of logging equipment is restricted because of the slope. The hazard of windthrow is slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope and frost action are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material reduces the potential for frost action.

The slope and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

DkE—Dunkirk silt loam, 25 to 45 percent slopes. This soil is steep, very deep, and well drained. It is on dissected valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or long and narrow and range from 15 to 45 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; brown silt loam

Subsurface layer:
6 to 12 inches; pale brown, friable silt loam

Subsoil:
12 to 21 inches; yellowish brown, friable silt loam
21 to 29 inches; yellowish brown, firm silty clay loam
29 to 38 inches; brown, firm silty clay loam

Substratum:
38 to 45 inches; brown, firm silty clay loam
45 to 72 inches; brown silt and clay

Included in mapping are small areas of the silty, well drained Unadilla soils, which have less clay in the subsoil than the Dunkirk soil; soils that have a surface layer of very fine sandy loam or gravelly silt loam; and the more sloping Dunkirk soils. Also included are a few wet spots and drainageways, which are identified on the soil maps by special symbols. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to moderately alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Very rapid
Hazard of erosion: Very severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used as woodland and wildlife habitat. Some of the acreage is idle land or is used as pasture.

This soil is not suited to cultivated crops or to hay because of the slope and the very severe hazard of erosion. It is highly susceptible to erosion if it is cultivated. Hay crops can be grown, but operating farm equipment is limited by the slope. A plant cover that controls runoff and erosion helps to protect the adjacent farmland.

Some areas of this soil are suited to permanent pasture, but reseeding and applying fertilizer are very difficult. Overgrazing during dry periods depletes the stand of pasture plants and increases the hazard of

erosion. Measures that maintain a good plant cover are needed.

The potential productivity of this soil for American basswood is moderate. The use of logging equipment is limited by the slope. The hazard of windthrow is slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope and frost action are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material reduces the potential for frost action.

The slope and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIIe.

ElA—Elnora fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and moderately well drained. It is on broad flats on lowland lake plains and on lowlands in the major valleys. Individual areas are oblong or irregularly shaped and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; very dark grayish brown fine sandy loam

Subsoil:

9 to 22 inches; yellowish brown, very friable loamy fine sand

22 to 30 inches; brown, mottled, very friable loamy fine sand

Substratum:

30 to 38 inches; brown, loose loamy fine sand

38 to 72 inches; dark grayish brown fine sand

Included in mapping are small areas of the somewhat poorly drained Minoa soils along drainageways and in slight depressions. Also included are spots of the well drained to excessively drained Colonie soils on small knolls and in the slightly higher positions on the landscape and small areas of soils that have an increased content of clay in bands or thin layers in the subsoil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderately rapid in the surface layer and rapid in the subsoil and substratum

Available water capacity: Low

Soil reaction: Extremely acid to slightly acid in the surface layer and subsoil and strongly acid to neutral in the substratum

Surface runoff: Slow

Hazard of erosion: Slight

Water table: At a depth of 1.5 to 2.0 feet from February through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and to early season vegetables. Crop growth is limited by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter. Increasing the content of organic matter improves the available water capacity of the soil. Crops respond well to liberal applications of lime and fertilizer. The soil is sometimes wet for short periods, but it dries quickly because of the rapid permeability in the subsoil.

Because of a very low content of organic matter, droughtiness in midsummer, and the sandy texture, this soil is only moderately well suited to hay and pasture. Because plant growth commonly is limited by midsummer, overgrazing at this time can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, deferring grazing as needed, controlling brush and weeds, applying a sufficient amount of lime and fertilizer, and seeding drought-tolerant species improve the quality and increase the quantity of pasture plants.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The

seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the subsoil. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIw.

EIB—Elnora fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is in undulating areas on lowland lake plains and in dissected areas on the side slopes of the major valleys. Individual areas are oblong or irregularly shaped and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; very dark grayish brown fine sandy loam

Subsoil:

9 to 22 inches; yellowish brown, very friable loamy fine sand

22 to 30 inches; brown, mottled, very friable loamy fine sand

Substratum:

30 to 38 inches; brown, loose loamy fine sand

38 to 72 inches; dark grayish brown fine sand

Included in mapping are small areas of the somewhat poorly drained Minoa soils along drainageways and in slight depressions. Also included are spots of the well drained to excessively drained Colonie soils on small knolls and in the slightly higher positions on the landscape and small areas of soils that are similar to the Elnora soil but have an increased content of clay in bands or thin layers in the subsoil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderately rapid in the surface layer and rapid in the subsoil and substratum

Available water capacity: Low

Soil reaction: Extremely acid to slightly acid in the surface layer and subsoil and strongly acid to neutral in the substratum

Surface runoff: Slow

Hazard of erosion: Slight

Water table: At a depth of 1.5 to 2.0 feet from February through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and to early season vegetables. It is limited by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter. Increasing the content of organic matter improves the available water capacity of the soil. Crops respond well to liberal applications of lime and fertilizer. The soil is sometimes wet for short periods, but it dries quickly because of the rapid permeability in the subsoil.

Because of a very low content of organic matter, droughtiness in midsummer, and the sandy texture, this soil is only moderately well suited to hay and pasture. Plant growth commonly is limited by midsummer, and overgrazing at this time can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, deferring grazing as needed, controlling brush and weeds, applying a sufficient amount of lime and fertilizer, and seeding drought-tolerant plants improve the quality and increase the quantity of pasture plants.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the subsoil. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIw.

ErA—Erie silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on broad flats on hilltops and till plains. Some areas receive runoff from the higher adjacent soils. Individual areas are irregular in shape. They commonly are 10 to 30 acres in size but range from 5 to 60 acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsurface layer:
12 to 15 inches; pale brown, mottled, friable silt loam

Subsoil:
15 to 28 inches; a fragipan of yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel
28 to 35 inches; brown, mottled, firm gravelly loam; 25 percent gravel

Substratum:
35 to 50 inches; brown, mottled, firm gravelly loam; 20 percent gravel
50 to 72 inches; brown, mottled, firm very gravelly silt loam; 35 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Busti soils, which do not have a fragipan; and Fremont soils, which have a higher content of clay in the subsoil than the Erie soil. Also included are areas of the moderately well drained Langford soils on slight rises and knolls. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsurface layer, moderately acid to moderately alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Erie soils. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Wetness can be reduced by installing closely spaced tile and open-ditch drainage systems. Maintaining good tilth is a management concern in some intensively cultivated areas. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damages the pasture. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the

wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

ErB—Erie silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is in areas on broad hilltops, concave toe slopes, and low till plains that receive runoff from the higher adjacent soils. Individual areas are oblong or circular and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsurface layer:
12 to 15 inches; pale brown, mottled, friable silt loam

Subsoil:
15 to 28 inches; a fragipan of yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel
28 to 35 inches; brown, mottled, firm gravelly loam; 25 percent gravel

Substratum:
35 to 50 inches; brown, mottled, firm gravelly loam; 20 percent gravel
50 to 72 inches; brown, mottled, firm very gravelly silt loam; 35 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Busti soils, which do not have a fragipan; and Fremont soils, which have a higher content of clay in the subsoil than the Erie soil. Also included are small areas of the moderately well drained Langford soils on slight rises and knolls. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsurface layer, moderately acid to moderately alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture (fig. 10). Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls

Figure 10.—Improved pasture in an area of Erie silt loam, 3 to 8 percent slopes. This soil is considered prime farmland in drained areas.

helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

ErC—Erie silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on hillsides, valley sides, and the side slopes of dissecting drainageways. It receives some runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 12 inches; very dark grayish brown silt loam

Subsurface layer:
12 to 15 inches; pale brown, mottled, friable silt loam

Subsoil:
15 to 28 inches; a fragipan of yellowish brown, mottled, firm gravelly silt loam; 15 percent gravel
28 to 35 inches; brown, mottled, firm gravelly loam; 25 percent gravel

Substratum:
35 to 50 inches; brown, mottled, firm gravelly loam; 20 percent gravel
50 to 72 inches; brown, mottled, firm very gravelly silt loam; 35 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions, in seepage spots, and along drainageways; Busti soils, which do not have a fragipan; and Fremont soils, which have a higher content of clay in the subsoil than the Erie soil. Also included are small areas of the moderately well drained Langford soils on slight rises and knolls and small areas of soils that have a gravelly surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to slightly acid in the surface layer and subsurface layer, moderately acid to moderately alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIe.

Fe—Fluvaquents-Udifluvents complex, frequently flooded. These nearly level, very deep soils are in areas of unconsolidated alluvium deposited in long, narrow strips along secondary streams. The soils are frequently flooded by nearby streams. Individual areas generally are elongated and are parallel to the nearby streams and creeks. They commonly are 10 to 20 acres in size but range from 10 to 75 acres.

This complex is about 55 percent Fluvaquents, 30 percent Udifluvents, and 15 percent included soils. The Fluvaquents and Udifluvents occur in such an intricate pattern that separating them was not practical at the

scale used in mapping. These soils show very little evidence of profile development. The soil characteristics vary considerably within short distances.

Fluvaquents have a black, gray, or brown surface layer 1 to 12 inches thick. This layer is silty or loamy and has varying amounts of gravel and cobblestones. The substratum is gray or brown material that is silty, sandy, or loamy and has varying amounts of gravel, flagstones, and cobblestones.

Udifluvents have a brown surface layer about 1 to 9 inches thick. This layer is sandy, silty, or loamy and has varying amounts of gravel and cobblestones. The substratum is brown or gray material that is sandy, silty, or loamy and has varying amounts of gravel, channery fragments, and cobblestones.

The Fluvaquents and Udifluvents are subject to frequent overflow from the adjacent streams, stream cutting, and erosion, all of which shift the deposits from one place to another. Fluvaquents are somewhat poorly drained, poorly drained, or very poorly drained, and Udifluvents are moderately well drained. Permeability, available water capacity, the content of small stones, and reaction vary considerably.

Most areas support native grasses or water-tolerant trees, such as willow, soft maple, and hemlock. Some areas consist of gravelly riverwash that does not support vegetation.

These soils have little potential for farming. Some cleared areas are used as pasture but are slowly reverting to brush and weeds. Areas that are suitable for pasture cannot be easily managed because they commonly are inaccessible, are long and narrow, and are dissected by old stream channels.

No capability subclass is assigned.

FmA—Fremont silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on flat hilltops that receive little or no runoff and on upland benches that receive runoff from the higher adjacent soils. Individual areas are circular or irregularly shaped. They commonly range from 5 to 50 acres in size, but some are as large as 100 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark brown silt loam

Subsoil:

8 to 19 inches; yellowish brown, mottled, friable channery silt loam; 30 percent channery fragments

19 to 35 inches; dark yellowish brown, mottled, firm channery silty clay loam; 20 percent channery fragments

Substratum:

35 to 72 inches; dark brown, mottled, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Volusia soils, which have a firm fragipan; and Busti soils, which have less clay in the subsoil than the Fremont soil. Also included are small areas of Orpark soils, which have bedrock at a depth of 20 to 40 inches, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow in the lower part of the subsoil and in the substratum

Available water capacity: High

Soil reaction: Very strongly acid to moderately acid throughout the profile

Surface runoff: Slow

Hazard of erosion: Slight

Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas are used for small grain, corn, or hay grown in support of dairy farming. Much of the acreage is idle land or is farmed at a low level of intensity. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Fremont soils. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Wetness can be reduced by providing closely spaced tile and open-ditch drainage systems. Maintaining good tilth is a management concern in intensively cultivated areas. Crops respond well to liberal applications of lime and fertilizer. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil

is wet restrict plant growth and can damage the pasture plants. Grazing when the soil is wet also results in compaction and puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

FmB—Fremont silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on broad hilltops and valley sides that receive a considerable amount of runoff from the higher adjacent soils. Individual areas are oblong or rectangular. They commonly are 5 to 75 acres in size but range from 10 to several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark brown silt loam

Subsoil:

8 to 19 inches; yellowish brown, mottled, friable channery silt loam; 30 percent channery fragments

19 to 35 inches; dark yellowish brown, mottled, firm channery silty clay loam; 20 percent channery fragments

Substratum:

35 to 72 inches; dark brown, mottled, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Volusia soils, which have a firm fragipan; and Busti soils, which have less clay in the subsoil than the Fremont soil. Also included are small areas of Orpark soils, which have bedrock at a depth of 20 to 40 inches, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Some areas are used for small grain, corn, or hay grown in support of dairy farming. A large acreage is idle land or is farmed at a low level of intensity. Some areas are wooded (fig. 11). Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. The soil tends to become cloddy if plowed when wet. If drained and protected from erosion, it is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter. Crops respond well to liberal applications of lime and fertilizer.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet can cause surface compaction, restrict plant growth, deplete the stand of

Figure 11.—A well managed stand of sugar maple in an area of Fremont silt loam, 3 to 8 percent slopes. The potential productivity for sugar maple is moderate on this soil.

pasture grasses, and increase the hazard of erosion. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the

wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

FmC—Fremont silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on hillsides and valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark brown silt loam

Subsoil:
8 to 19 inches; yellowish brown, mottled, friable channery silt loam; 30 percent channery fragments
19 to 35 inches; dark yellowish brown, mottled, firm channery silty clay loam; 20 percent channery fragments

Substratum:
35 to 72 inches; dark brown, mottled, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Volusia soils, which have a firm fragipan; and Busti soils, which have less clay in the subsoil than the Fremont soil. Also included are areas of Orpark soils, which have bedrock at a depth of 20 to 40 inches; soils that have a channery surface layer; and the moderately well drained Schuyler soils. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Some areas are farmed at a low level of intensity. These areas are used for small grain, corn, or hay grown in support of dairy farming. A large acreage is woodland or is idle land that is reverting to woodland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. The soil tends to become cloddy if plowed when wet. If drained and protected from erosion, it is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter. Crops respond well to liberal applications of lime and fertilizer.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are

available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIe.

FmD—Fremont silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and somewhat poorly drained. It is on valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or long and narrow and range from 10 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark brown silt loam

Subsoil:

8 to 19 inches; yellowish brown, mottled, friable channery silt loam; 30 percent channery fragments

19 to 35 inches; dark yellowish brown, mottled, firm channery silty clay loam; 20 percent channery fragments

Substratum:

35 to 72 inches; dark brown, mottled, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the poorly drained Ashville soils in seepage spots and along drainageways, small areas of the moderately well drained Schuyler soils, and small areas of Orpark soils, which have bedrock within a depth of 40 inches. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderately slow or moderate in the upper part of the subsoil, and slow in the lower part of the subsoil and in the substratum

Available water capacity: High

Soil reaction: Very strongly acid to moderately acid throughout the profile

Surface runoff: Rapid

Hazard of erosion: Severe

Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas are used as woodland. Some areas are used for hay, pasture, or row crops grown in support of dairy farming.

This soil is poorly suited to cultivated crops because of the hazard of erosion and the slope. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, tilling across the slope, stripcropping, and including sod crops in the cropping system help to maintain good tilth, increase the content of organic matter, and control erosion. Because of the slope, operating farm machinery is difficult and hazardous on this soil.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing and grazing when the soil is wet restrict plant growth and can damage pasture plants. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs. Because the soil is naturally acid, applications of lime and fertilizer are needed to improve the growth of most pasture plants.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic

tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IVe.

FrB—Frewsburg silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained. It is on broad hilltops that do not receive runoff from the higher adjacent soils and on side slopes that receive a considerable amount of runoff from the higher adjacent soils. The soil is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are circular or irregularly shaped and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches; dark grayish brown silt loam

Subsoil:

7 to 13 inches; brownish yellow, mottled, very friable silt loam

13 to 17 inches; strong brown, mottled, friable channery silt loam; 15 percent channery fragments

17 to 25 inches; brown, mottled, firm channery clay loam; 15 percent channery fragments

25 to 38 inches; olive, mottled, firm channery silty clay loam; 15 percent channery fragments

Bedrock:

38 inches; olive gray siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of the well drained Carrollton soils on slight rises and knolls. Also included are small areas of Ivory and Onoville soils, which are more than 40 inches deep over bedrock. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Some areas are used for small grain, corn, or hay grown in support of dairy farming. A large acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a hazard on long slopes that are intensively cultivated. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of lime and fertilizer.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The hazards of erosion and windthrow are slight. The seedling mortality rate is low. The seasonal wetness limits the use of logging equipment.

The depth to bedrock and the wetness are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Installing drains around footings helps to remove any lateral seepage moving through fractures in the bedrock.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing

roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock commonly can be ripped. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields reduces the wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIw.

FrC—Frewsburg silt loam, 8 to 15 percent slopes. This soil is strongly sloping, moderately deep, and somewhat poorly drained. It is on broad hilltops and side slopes. It is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are circular or irregularly shaped and range from 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 7 inches; dark grayish brown silt loam

Subsoil:

7 to 13 inches; brownish yellow, mottled, very friable silt loam

13 to 17 inches; strong brown, mottled, friable channery silt loam; 15 percent channery fragments

17 to 25 inches; brown, mottled, firm channery clay loam; 15 percent channery fragments

25 to 38 inches; olive, mottled, firm channery silty clay loam; 15 percent channery fragments

Bedrock:

38 inches; olive gray siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of the well drained Carrollton soils on slight rises and knolls. Also included are small areas of Ivory and Onoville soils, which are more than 40 inches deep over bedrock. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and moderately slow in the lower part of the subsoil

Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid throughout the profile

Surface runoff: Rapid

Hazard of erosion: Moderate

Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May

Flooding: None

Depth to bedrock: 20 to 40 inches

Some areas are used for small grain, corn, or hay grown in support of dairy farming. A large acreage is woodland or is idle land that is reverting to woodland.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. The hazard of erosion is moderate. Applying a system of conservation tillage that leaves crop residue on the surface after planting, farming on the contour, and terracing help to control erosion. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of lime and fertilizer.

This soil is suited to hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The hazards of erosion and windthrow are slight. The seedling mortality rate is low. The seasonal wetness limits the use of logging equipment.

The depth to bedrock and the wetness are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Installing drains around footings helps to remove lateral seepage moving through fractures in the bedrock.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing

roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock commonly can be ripped. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields reduces the wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

Ge—Getzville silt loam. This soil is very deep, nearly level, and poorly drained or very poorly drained. It is mainly on the lowland plains in the wide major valleys. Individual areas are oblong. They generally range from 10 to 50 acres in size, but some are as large as 100 acres or more. Slopes generally are smooth and are less than 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; very dark grayish brown silt loam

Subsoil:
10 to 22 inches; grayish brown, mottled, friable silt loam

Substratum:
22 to 30 inches; grayish brown, loose loamy sand
30 to 72 inches; grayish brown, stratified sand

Included in mapping are small areas of the somewhat poorly drained Swormville soils on the slightly higher benches and small areas of the somewhat poorly drained Raynham soils, which are silty throughout. Also included are small areas of Lamson soils, which are sandy throughout, and a few small areas of soils that have a mucky surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate or moderately slow in the surface layer and subsoil and moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and neutral or mildly alkaline in the substratum
Surface runoff: Intermittently ponded or very slow
Hazard of erosion: Slight
Water table: At the surface or within a depth of 0.5 foot from November through June
Flooding: Rare
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Some areas are used as pasture, and a few areas have been drained and are cultivated. This soil meets the requirements for hydric soils.

This soil is poorly suited to cultivated crops because of prolonged wetness. If drained, it is suited to many crops. Draining the soil may be difficult, however, because of its low position on the landscape. Generally, some combination of open ditches and subsurface drains is desirable. Because of the sandy substratum, drains do not have to be closely spaced. Tilth and soil structure deteriorate if the soil is plowed when wet. Growing cover crops, incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

If partially drained, this soil is suited to pasture. Grazing when the soil is wet can result in surface compaction, puddling, and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush by mowing annually, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The hazard of erosion is slight. Prolonged wetness results in a high seedling mortality rate and restricts the growth of roots. The hazard of windthrow and the equipment limitation are severe because of the prolonged wetness. The trees that can withstand wetness grow best.

Prolonged wetness and the hazard of flooding are the main management concerns on sites for dwellings with basements. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Raynham soils are better sites for these dwellings. Building on raised fill material helps to overcome the wetness.

Prolonged wetness and frost action are the main limitations on sites for local roads and streets. Building on raised fill material and installing roadside drainage systems help to overcome these limitations.

Prolonged wetness is the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of wetness, the included Swormville soils also

are limited as sites for septic tank absorption fields, but they are better suited than this soil.

This soil is suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is IVw.

Ha—Halsey mucky silt loam. This soil is nearly level, very deep, and very poorly drained. It is in low areas and depressions on outwash plains. Individual areas are circular or oblong. They generally range from 5 to 50 acres in size, but some are as large as 100 acres or more. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark gray mucky silt loam

Subsurface layer:
9 to 16 inches; gray, mottled, friable loam; 10 percent gravel

Subsoil:
16 to 21 inches; gray, mottled, friable loam; 10 percent gravel
21 to 26 inches; gray, mottled, friable loam; 5 percent gravel

Substratum:
26 to 45 inches; grayish brown gravelly loamy sand; 20 percent gravel
45 to 72 inches; grayish brown loamy sand; 5 percent gravel

Included in mapping are small areas of the somewhat poorly drained Red Hook soils on the slightly higher rises and benches, soils having a subsoil that is finer textured than that of the Halsey soil, and soils that do not have a mucky surface layer. Also included are small areas of Alden soils. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, subsurface layer, and subsoil and rapid in the substratum
Available water capacity: Low
Soil reaction: Moderately acid to neutral in the surface layer, subsurface layer, and subsoil and slightly acid to moderately alkaline in the substratum
Surface runoff: Intermittently ponded to slow
Hazard of erosion: Slight
Water table: As much as 1 foot above the surface or at the surface from September through June
Flooding: Rare
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Some areas are used as pasture, and some drained areas are cultivated. This soil meets the requirements for hydric soils.

Unless drained, this soil is not suited to cultivated crops. If drained, it is suited to a variety of crops. Draining the soil may be difficult, however, because of its low position on the landscape. Tile and open-ditch drainage systems are suitable in areas where outlets are available. Because of the sandy substratum, drains do not have to be closely spaced. Tilth and soil structure deteriorate if the soil is plowed when wet. Growing cover crops, incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

The suitability of this soil for pasture is limited. The surface layer can easily become compacted when wet. Surface compaction and overgrazing can deplete the stand of desirable plant species and result in ponding. The pasture plants selected for seeding should be those that can withstand long wet periods and restricted root growth. The pasture should be plowed, a seedbed prepared, and seeds planted during dry periods in summer. Using proper stocking rates, rotating livestock grazing, and controlling brush and weeds by mowing annually are the main management needs.

The potential productivity of this soil for red maple is moderate. The erosion hazard is slight. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. The hazard of windthrow and the equipment limitation are severe because of the prolonged wetness. The trees that can withstand wetness grow best.

Ponding and the hazard of flooding are the main management concerns on sites for dwellings with basements. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Raynham soils are better sites for these dwellings. Building on raised fill material helps to overcome the wetness.

Ponding and frost action are the main management concerns on sites for local roads and streets. Building on raised fill material helps to overcome the wetness and reduces the potential for frost action.

Ponding and a poor filtering capacity are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of wetness, the included areas of Red Hook soils also are limited as sites for

septic tank absorption fields, but they are better suited than this soil.

This soil is suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is Vw.

He—Hamlin silt loam. This soil is nearly level, very deep, and well drained. It is on the higher parts of flood plains along the major streams in the county. Individual areas generally are oblong and are parallel to the adjacent streams and creeks. They range from 5 to 30 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
8 to 31 inches; brown, friable silt loam
31 to 38 inches; brown, friable very fine sandy loam

Substratum:
38 to 72 inches; grayish brown and dark brown fine sandy loam

Included in mapping are small areas of the moderately well drained Teel soils in slight depressions and old drainageways and small areas of Tioga soils, which have more sand and gravel than the Hamlin soil. Also included are small areas of the poorly drained and very poorly drained Wayland soils in old meander scars and former drainageways and small areas of Fluvaquents and Udifluvents, which consist of unconsolidated alluvial deposits. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Strongly acid to neutral to a depth of 20 inches and moderately acid to moderately alkaline below that depth
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 3 to 6 feet from November through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops. Some of the acreage is idle land or woodland, which is generally in isolated areas that cannot be easily farmed. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops. Flooding is a hazard, but it generally occurs early in spring, before crops are planted. Deep-rooted perennial crops, such as alfalfa, grow especially well. The soil has a stone-free surface layer and can be easily tilled. If the wet included areas are drained, the fields can be managed more uniformly. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as growing cover crops, incorporating crop residue into the soil, growing occasional sod crops, and minimizing tillage. Measures that protect streambanks and improve channels are needed in places to protect the soil from flooding.

Hay and pasture plants grow well on this soil. Overgrazing can damage pasture plants and restrict plant growth. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and deferring grazing early in spring are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazard of erosion, the equipment limitation, and the hazard of windthrow are slight, and the seedling mortality rate is low. Planting seedlings early in spring, when the soil is moist, helps to ensure their survival.

The flooding is the main hazard on sites for dwellings with basements. Fill material is needed to elevate the construction sites above the high water level during periods of flooding.

The hazard of flooding and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. The roads and streets should be built on raised fill material so that they are above the level of flooding.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Building on raised fill material helps to overcome the wetness.

This soil is an excellent source of topsoil.

The capability class is I.

Hm—Henrietta muck. This soil is nearly level, very deep, and very poorly drained. It is in basinlike areas and in low, swampy areas that are wet most of the year. Individual areas are circular or irregularly shaped. They generally range from 10 to 50 acres in size, but some are as large as 100 acres or more. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; black muck

Subsurface layer:
8 to 12 inches; very dark gray muck

Subsoil:
12 to 22 inches; gray, mottled, friable silt loam
22 to 35 inches; gray, mottled, friable fine sandy loam

Substratum:
35 to 65 inches; gray, loose loamy fine sand
65 to 72 inches; gray, stratified fine sand and sand

Included in mapping are small areas of Palms soils, which have a layer of muck that is more than 16 inches thick; Lamson soils, which have sandy deposits at the surface; and Canandaigua soils, which have silty deposits at the surface. The mineral included soils generally are in narrow bands around the edges of the mapped areas or on slight rises within the areas. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderately slow to moderately rapid in the surface layer and subsurface layer and moderate in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to mildly alkaline throughout the profile
Surface runoff: Intermittently ponded to slow
Hazard of erosion: Slight
Water table: 1 foot above to 1 foot below the surface from November through June
Flooding: None
Depth to bedrock: More than 6 feet

Most areas support cattails and water-tolerant grasses, sedges, brush, and trees. Most of the trees grow on windthrow mounds. Some areas have been drained and are used for vegetables or for cultivated crops grown in support of dairy farming.

Unless drained, this soil is not suited to cultivated crops. If drained, it is suited to many cultivated crops and vegetables. A good drainage system generally includes open ditches and subsurface drains. Installing drains is extremely difficult in many areas because the soil is in low positions on the landscape, where suitable outlets are not available. The sides of large open ditches are unstable and tend to slump or slide. Incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and rotating crops help to maintain tilth. Minimizing tillage, growing cover crops, and establishing windbreaks reduce the hazard of wind erosion.

Unless a drainage system is installed, the suitability of this soil for pasture is limited. The organic surface layer can easily become compacted if the soil is grazed when wet. Compaction can deplete the stand of desirable plants. The pasture plants selected for seeding should be those that can withstand long wet periods and restricted root growth. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for white ash is moderate. The hazard of erosion is slight. Prolonged wetness increases the seedling mortality rate and restricts the growth of roots. The hazard of windthrow and the equipment limitation are severe because of the prolonged wetness. The trees that can withstand wetness grow best.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements. The soil is too wet for the construction of dwellings with basements. Building on raised fill material helps to overcome the wetness and reduces the hazard of ponding.

Ponding and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. The roads and streets should be built on raised fill material so that they are above the level of ponding.

Prolonged wetness and ponding are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed.

This soil is suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is Vw.

HnA—Hinesburg fine sandy loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained. It is in undulating areas on former deltas and lake plains. Individual areas are irregular in shape and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown fine sandy loam

Subsoil:
9 to 23 inches; yellowish brown loamy fine sand
23 to 32 inches; yellowish brown, very friable loamy fine sand

Substratum:
32 to 55 inches; pale brown, friable silt loam
55 to 72 inches; pale brown, mottled, friable silt loam

Included in mapping are small areas of moderately well drained soils along drainageways and in slight depressions; Colonie soils, which have coarser sand than that in the Hinesburg soil; and Unadilla soils, which are silty. Also included are small areas of the somewhat poorly drained Minoa soils, which are identified on the soil maps by a wet spot symbol. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Rapid in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and subsoil and strongly acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.5 feet from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for row crops or hay grown in support of dairy farming. Small woodlots are in some areas, and some of the acreage is idle land. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It is especially well suited to deep-rooted legumes. Crop growth is restricted by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Wind erosion is a hazard in areas where the plant cover has been removed. Minimizing tillage, growing cover crops, adding animal waste to the soil, incorporating crop residue into the soil, and including sod crops in the cropping system increase the content of organic matter and help to maintain tilth. Crops respond very well to liberal applications of lime and fertilizer.

Because of a very low content of organic matter, droughtiness, and the sandy texture, this soil is only moderately well suited to pasture. Some areas can be used for early season pasture, but plant growth commonly is limited by midsummer. Overgrazing in summer can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for eastern white pine is high. The hazards of erosion and windthrow and the equipment limitation are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the subsoil. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Adding permeable fill material helps to overcome the restricted permeability in the substratum.

The capability subclass is IIs.

HnB—Hinesburg fine sandy loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is in undulating areas on former deltas and lake plains. Individual areas are irregular in shape and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown fine sandy loam

Subsoil:
9 to 23 inches; yellowish brown loamy fine sand
23 to 32 inches; yellowish brown, very friable loamy fine sand

Substratum:
32 to 55 inches; pale brown, friable silt loam
55 to 72 inches; pale brown, mottled, friable silt loam

Included in mapping are small areas of moderately well drained soils along drainageways and in slight depressions; Colonie soils, which have coarser sand than that in the Hinesburg soil; and Unadilla soils, which are silty. Also included are some small areas of the somewhat poorly drained Minoa soils, which are identified on the soil maps by a wet spot symbol. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Rapid in the surface layer and subsoil and moderately slow in the substratum

Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and subsoil and strongly acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.5 feet from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for row crops or hay grown in support of dairy farming. Small woodlots are in some areas, and some of the acreage is idle land. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops and to early season vegetables. It is especially well suited to deep-rooted legumes. Crop growth is restricted by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Wind erosion is a hazard in areas where the plant cover has been removed. Water erosion is a minor problem in intensively cultivated areas on long slopes. Stripcropping and terracing reduce the hazard of erosion and conserve moisture. Minimizing tillage, growing cover crops, adding animal waste to the soil, incorporating crop residue into the soil, and including sod crops in the cropping system increase the content of organic matter and help to maintain tilth. Crops respond very well to liberal applications of lime and fertilizer.

Because of a very low content of organic matter, droughtiness, and the sandy texture, this soil is only moderately well suited to pasture. Some areas can be used for early season pasture, but plant growth commonly is limited by midsummer. Overgrazing in summer can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for eastern white pine is high. The hazards of erosion and windthrow and the equipment limitation are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the subsoil. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Adding permeable fill material helps to overcome the restricted permeability in the substratum.

The capability subclass is IIs.

HnC—Hinesburg fine sandy loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained. It is on the side slopes of dissected deltas on former lake plains and along valley sides. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown fine sandy loam

Subsoil:
9 to 23 inches; yellowish brown loamy fine sand
23 to 32 inches; yellowish brown, very friable loamy fine sand

Substratum:
32 to 55 inches; pale brown, friable silt loam
55 to 72 inches; pale brown, mottled, friable silt loam

Included in mapping are small areas of moderately well drained soils along drainageways and in slight depressions; Colonie soils, which have coarser sand than that in the Hinesburg soil; and Unadilla soils, which are silty. Also included are some small areas of the somewhat poorly drained Minoa soils, which are identified on the soil maps by a wet spot symbol. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Rapid in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: Moderate
Soil reaction: Moderately acid or slightly acid in the surface layer and subsoil and strongly acid to neutral in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.5 feet from November through May

Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for row crops or hay grown in support of dairy farming. Small woodlots are in some areas, and some of the acreage is idle land.

This soil is moderately well suited to cultivated crops and to early season vegetables. It is especially suited to deep-rooted legumes. Crop growth is restricted by droughtiness in midsummer and by low natural fertility. This stone-free soil generally can be easily tilled. Wind erosion is a hazard in areas where the plant cover has been removed. Water erosion also is a hazard, particularly in cultivated areas on long slopes. Stripcropping and diversion ditches reduce the hazard of erosion and conserve moisture. Minimizing tillage, growing cover crops, adding animal waste to the soil, incorporating crop residue into the soil, and including sod crops in the cropping system increase the content of organic matter and help to maintain tilth. Crops respond very well to liberal applications of lime and fertilizer.

Because of a very low content of organic matter, droughtiness, and the sandy texture, this soil is only moderately well suited to pasture. Some areas can be used for early season pasture, but plant growth usually is limited by midsummer. Overgrazing in summer can deplete the stand of pasture grasses. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for eastern white pine is high. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is high because of the droughtiness of the soil. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, especially in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the subsoil. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Adding permeable fill material helps to overcome the restricted permeability in the substratum.

The capability subclass is IIIe.

Ho—Holderton silt loam. This soil is nearly level, very deep, and somewhat poorly drained. It is in low areas on flood plains along the major streams in the county. Individual areas generally are oblong and commonly are parallel to the adjacent streams. They range from 5 to 40 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; dark grayish brown silt loam

Subsoil:
10 to 14 inches; dark brown, mottled, friable silt loam
14 to 29 inches; gray, mottled, friable silt loam
29 to 38 inches; dark gray, mottled, friable fine sandy loam

Substratum:
38 to 72 inches; dark gray fine sandy loam

Included in mapping are small areas of the poorly drained Wayland soils in slight depressions and along the older meander scars, the moderately well drained Middlebury soils in the slightly higher positions on the landscape, and soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: High
Soil reaction: Moderately acid to neutral throughout the profile
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from November through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for row crops grown in support of dairy farming. Some of the acreage is woodland or idle land, which commonly is in isolated spots that cannot be easily farmed. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Flooding can delay planting or damage crops in some years. The seasonal high water table can delay tillage

and planting and can make harvesting difficult, especially in low areas. The wetness can be reduced by installing subsurface drains in areas where adequate outlets are available. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. It has a stone-free surface layer and can be easily tilled. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and growing occasional sod crops help to maintain tilth and the content of organic matter. Measures that protect streambanks are needed in some areas to prevent lateral erosion in the fields.

Hay and pasture plants grow well on this soil. Overgrazing and grazing when the soil is wet can cause surface compaction, restrict plant growth, and damage pasture plants. Using proper stocking rates, rotating grazing, controlling weeds and brush, and deferring grazing early in spring are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding. Building on fill material, installing drains around footings, and sealing foundations and basement walls help to prevent excessive wetness in basements.

The hazard of flooding, the seasonal wetness, and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding and helps to overcome the wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Building on raised fill material helps to overcome the wetness and reduces the hazard of flooding.

The capability subclass is IIIw.

HrA—Hornell silt loam, 0 to 3 percent slopes. This soil is nearly level, moderately deep, and somewhat poorly drained. It is on broad flats in areas where the topography is influenced by the underlying bedrock. Soft shale bedrock is at a depth of 20 to 40 inches. Individual areas are oblong and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
8 to 15 inches; yellowish brown, mottled, firm silty clay loam
15 to 31 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments
31 to 35 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments

Substratum:
35 to 38 inches; olive gray, mottled channery silty clay; 30 percent rock fragments

Bedrock:
38 inches; gray, soft shale interbedded with siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Orpark soils, which have less clay than the Hornell soil. Also included are small areas of soils that have bedrock at a depth of more than 40 inches and small areas of Fremont soils, which are very deep over bedrock and have less clay in the subsoil than the Hornell soil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards.

This soil is only moderately well suited to cultivated crops because of the seasonal wetness, the clayey subsoil, and low natural fertility. Installing subsurface drainage systems can be difficult because of the moderate depth to soft shale. Plowing only when the soil is at the proper moisture content is important because the clayey subsoil tends to develop poor tilth

and become cloddy if the soil is tilled when wet. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Hornell soils. Liberal applications of fertilizer and lime commonly are needed for optimum crop growth. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant grasses and late-spring pasture. Overgrazing and grazing when the soil is wet restrict plant growth and can damage the pasture plants. Grazing when the soil is wet also results in compaction and puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazards of erosion and windthrow are slight. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to overcome the wetness.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness, the restricted permeability, and the moderate depth to bedrock are the main limitations on sites for septic tank absorption fields. The shale bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIIw.

HrB—Hornell silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained. It is on broad flats and side slopes in areas where the topography is influenced by the underlying bedrock. Soft shale bedrock is at a depth of 20 to 40 inches. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
8 to 15 inches; yellowish brown, mottled, firm silty clay loam
15 to 31 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments
31 to 35 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments

Substratum:
35 to 38 inches; olive gray, mottled channery silty clay; 30 percent rock fragments

Bedrock:
38 inches; gray, soft shale interbedded with siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Orpark soils, which have less clay than the Hornell soil. Also included are small areas of soils that have bedrock at a depth of more than 40 inches and small areas of Fremont soils, which are very deep over bedrock and have less clay in the subsoil than the Hornell soil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a hazard on long slopes that are intensively cultivated. If a drainage system is installed,

the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of fertilizer and lime.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion and in puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazards of erosion and windthrow are slight. The seasonal wetness limits the use of equipment and increases the seedling mortality rate.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the wetness and the potential for frost action.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The shale bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIw.

HrC—Hornell silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and somewhat poorly drained. It is on valley sides and hillsides in areas where the topography is influenced by the underlying bedrock. Soft shale bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent areas. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; dark grayish brown silt loam

Subsoil:
8 to 15 inches; yellowish brown, mottled, firm silty clay loam
15 to 31 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments
31 to 35 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments

Substratum:
35 to 38 inches; olive gray, mottled channery silty clay; 30 percent rock fragments

Bedrock:
38 inches; gray, soft shale interbedded with siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Orpark soils, which have less clay than the Hornell soil. Also included are small areas of soils that have bedrock at a depth of more than 40 inches and small areas of Fremont soils, which are very deep over bedrock and have less clay in the subsoil than the Hornell soil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a serious hazard on long slopes that are intensively cultivated. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of fertilizer and lime.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion and in puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is a management concern. Establishing logging roads and skid trails across the slope helps to control erosion and gullying. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. The hazard of windthrow is slight.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to overcome the wetness.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength, reduce the potential for frost action, and help to overcome the wetness.

The seasonal wetness, the restricted permeability, and the moderate depth to bedrock are the main limitations on sites for septic tank absorption fields. The shale bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

HrD—Hornell silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately deep, and somewhat poorly drained. It is on valley sides that commonly are dissected by V-shaped gullies. It is in areas where the topography is influenced by the underlying bedrock. Soft shale bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 8 inches; dark grayish brown silt loam

Subsoil:

8 to 15 inches; yellowish brown, mottled, firm silty clay loam

15 to 31 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments

31 to 35 inches; strong brown, mottled, firm silty clay; 10 percent rock fragments

Substratum:

35 to 38 inches; olive gray, mottled channery silty clay; 30 percent rock fragments

Bedrock:

38 inches; gray, soft shale interbedded with siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in seepage spots and small areas of Orpark soils, which have less clay than the Hornell soil. Also included are small areas of soils that have bedrock at a depth of more than 40 inches and small areas of the moderately well drained Schuyler soils, which are very deep over bedrock.

Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most areas are used as woodland. Some of the acreage is idle land that is reverting to woodland. A few small areas are used for hay or pasture.

This soil is poorly suited to cultivated crops because of the severe hazard of erosion and the slope. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Intercepting and diverting runoff and subsurface seepage, establishing sod waterways, farming on the contour, and minimizing tillage reduce the wetness and the hazard of erosion. The content of organic matter has been depleted as a result of past erosion, and the soil tends to become cloddy if it is plowed when wet. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter. The slope and the gullies in some areas limit the use of farm machinery.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing and grazing when the soil is wet restrict plant growth and can damage pasture plants. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs. Because the soil is naturally acid, applications of lime and fertilizer are needed to improve the growth of most pasture plants.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails.

The slope, the seasonal wetness, and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Extensive land shaping may be necessary to overcome the slope. Although excavation is costly, the shale bedrock generally can be ripped with a backhoe. Installing drains around footings and sealing foundations and basement walls help to overcome the wetness.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength, reduce the potential for frost action, and help to overcome the wetness. Land grading can overcome the slope.

The seasonal wetness, the restricted permeability, and the moderate depth to bedrock are the main limitations on sites for septic tank absorption fields. The shale bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

IvB—Ivory silty clay loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on broad hilltops and side slopes that receive little runoff from the higher adjacent soils. The soil is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are circular or oblong and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches; dark yellowish brown silty clay loam

Subsoil:
5 to 12 inches; yellowish brown, mottled, friable silty clay loam
12 to 15 inches; gray, mottled, friable silty clay loam
15 to 35 inches; yellowish brown, mottled, firm silty clay loam

Substratum:
35 to 52 inches; dark brown, dark reddish brown, strong brown, and gray very channery silty clay loam; 50 percent channery fragments
52 to 72 inches; light olive brown, strong brown, and light greenish gray very channery silty clay loam; 45 percent channery fragments

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Frewsburg soils, which have bedrock at a depth of 20 to 40 inches. Included areas make up about 10 to 15 percent of this unit.

Soil properties—

Permeability: Moderately slow in the surface layer and in the upper part of the subsoil and slow in the lower part of the subsoil and in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from October through May
Flooding: None
Depth to bedrock: More than 5 feet

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a hazard in intensively cultivated areas on long slopes. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Subsurface drains should be closely spaced because of the restricted permeability in the subsoil. Contour farming and stripcropping in combination with diversions or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of lime and fertilizer.

This soil is suited to water-tolerant grasses and late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, depletes the stand of pasture grasses, and increases the hazard of erosion. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling brush and weeds, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The hazard of erosion is moderate. Building logging roads and skid trails across the slope helps to control erosion and gullying. The seasonal wetness limits the use of equipment and results in a high seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Installing roadside drainage systems reduces the wetness.

The seasonal wetness and the slow permeability are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIw.

KnE—Kinzua channery silt loam, 25 to 45 percent slopes. This soil is steep, very deep, and well drained. It is on valley sides that receive runoff from the higher adjacent soils. It is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches; dark grayish brown channery silt loam

Subsoil:
3 to 11 inches; yellowish brown, friable channery silt loam; 25 percent channery fragments
11 to 34 inches; yellowish brown, friable channery silt loam; 30 percent channery fragments
34 to 42 inches; brown, firm channery silt loam; 30 percent channery fragments

Substratum:
42 to 72 inches; brown, firm channery silt loam; 30 percent channery fragments

Included in mapping are small areas of the moderately well drained Onoville soils in seepage spots and small areas of Carrollton soils, which have bedrock within a depth of 40 inches. Also included are Schuyler and Towerville soils in small areas where glacial till is adjacent to soils that formed in bedrock residuum. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow in the substratum
Available water capacity: High
Soil reaction: Very strongly or strongly acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of 4 to 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used as woodland and wildlife habitat. Some of the less sloping areas are idle or are used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm machinery is very difficult because of the slope. A plant cover that controls runoff and erosion is essential.

The less sloping areas of this soil can be used as pasture on a limited basis. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Reseeding pastures is difficult because of the slope. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for northern red oak is moderate. The use of equipment is restricted by the slope. The seedling mortality rate is low, and the hazard of windthrow is slight. Seedlings grow better if they are planted early in spring, when the soil is moist. The hazard of erosion is moderate. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land shaping and grading help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope is the main limitation on sites for local roads and streets. Land grading and building on the contour help to overcome this limitation.

The slope and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIIe.

La—Lamson silt loam. This soil is nearly level, very deep, and poorly drained. It is on flat lowlands on lake plains and on broad flats in the major valleys. Individual areas are oblong or irregularly shaped. They range mainly from 10 to 50 acres in size, but some are as large as 100 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown silt loam

Subsurface layer:
8 to 12 inches; gray, mottled, very friable very fine sandy loam

Subsoil:
12 to 22 inches; brown, mottled, very friable very fine sandy loam
22 to 37 inches; grayish brown fine sandy loam

Substratum:
37 to 72 inches; dark grayish brown fine sandy loam and fine sand

Included in mapping are small areas of soils that are similar to the Lamson soil but are very poorly drained and have a mucky surface layer. Also included are areas of the somewhat poorly drained Minoa soils on slight rises; a few spots of Getzville soils, which have a silty mantle and are underlain by sandy deposits; and areas of soils that have a surface layer of fine sandy loam. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid throughout the profile
Available water capacity: Low
Soil reaction: Moderately acid to mildly alkaline in the surface layer and subsurface layer and slightly acid to moderately alkaline in the subsoil and substratum
Surface runoff: Very slow or ponded
Hazard of erosion: Slight
Water table: As much as 1.0 foot above the surface or within a depth of 0.5 foot from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Much of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Some areas have been cleared and are used for small grain, corn, or hay grown in support of dairy farming. Areas on lake plains are used for vegetables or vineyards. This soil meets the requirements for hydric soils.

Unless a drainage system is installed, this soil is not suited to cultivated crops. Drainage outlets commonly are not readily available because the soil is in low areas. Where a drainage system is feasible, the soil is well suited to field crops and to some vegetables. Generally, some combination of open ditches and subsurface drains is desirable. Because of the sandy substratum, subsurface drains do not have to be closely spaced. Although this stone-free soil can be easily tilled, tilth and soil structure deteriorate if the soil is plowed when wet. Growing cover crops, incorporating crop residue into the soil, tilling only when the soil is at the proper moisture content, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

If partially drained, this soil is suited to pasture. Grazing when the soil is wet results in surface compaction, puddling, and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling brush and weeds by mowing annually, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for eastern white pine is high. Prolonged wetness causes a high seedling mortality rate and restricts the growth of roots. The hazard of windthrow and the equipment limitation are severe because of the prolonged wetness. The trees that can withstand wetness grow best.

Prolonged wetness and ponding are the main management concerns on sites for dwellings with basements. The soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Minoa soils are better sites for these dwellings. Building on raised fill material helps to overcome the wetness.

Prolonged wetness and frost action are the main limitations on sites for local roads and streets. Building on raised fill material and installing roadside drainage systems help to overcome these limitations.

Prolonged wetness and ponding are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Because of wetness, the included areas of Minoa soils also are limited as sites for absorption fields, but they are better suited than this soil.

This soil is suited to wetland wildlife habitat and to the development of recreational ponds.

The capability subclass is Vw.

LnB—Langford silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is on convex hilltops and on side slopes that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsoil:
9 to 15 inches; yellowish brown, friable silt loam
15 to 21 inches; yellowish brown, mottled, friable silt loam
21 to 45 inches; a fragipan of brown, mottled, firm gravelly silt loam; 15 percent gravel

Substratum:
45 to 72 inches; brown, firm gravelly silt loam; 20 percent gravel

Included in mapping are small areas of the somewhat poorly drained Erie soils along drainageways and in seepage spots; Chautauqua soils, which do not have a firm fragipan; and Schuyler soils, which do not have a firm fragipan and have more clay in the subsoil than the Langford soil. Also included are spots of Langford soils that have a gravelly surface layer. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the surface layer, strongly acid to neutral in the part of the subsoil above the fragipan, strongly acid to mildly alkaline in the fragipan, and neutral to moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming. Some of the acreage is

woodland or is idle land that is reverting to brush and shrubs. This soil meets the requirements for prime farmland.

If drained, this soil is well suited to most of the crops commonly grown in the county, particularly corn, small grain, and alfalfa. A subsurface drainage system is needed in wet spots, and diversion ditches are needed to control runoff in many fields. Erosion is a hazard on long slopes. Measures that maintain tilth and increase the content of organic matter include tilling only when the soil is at the proper moisture content, incorporating crop residue into the soil, and growing cover crops. Minimizing tillage, farming on the contour, and stripcropping help to control erosion on long slopes.

This soil is well suited to pasture. Overgrazing is a major concern in managing pasture because it can damage pasture plants. Grazing early in spring, when the soil is wet, can result in surface compaction and can damage the pasture. Rotating livestock grazing, using proper stocking rates, controlling weeds and brush, and deferring grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The perched seasonal high water table is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the fragipan and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIw.

LnC—Langford silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and moderately well drained. It is on hillsides and side slopes that receive runoff from the higher adjacent soils. Individual areas are rectangular and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsoil:
9 to 15 inches; yellowish brown, friable silt loam
15 to 21 inches; yellowish brown, mottled, friable silt loam
21 to 45 inches; a fragipan of brown, mottled, firm gravelly silt loam; 15 percent gravel

Substratum:
45 to 72 inches; brown, firm gravelly silt loam; 20 percent gravel

Included in mapping are small areas of the somewhat poorly drained Erie soils along drainageways and in seepage spots; Chautauqua soils, which do not have a firm fragipan; and Schuyler soils, which do not have a firm fragipan and have more clay in the subsoil than the Langford soil. Also included are small areas of Langford soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow in the lower part of the subsoil and in the substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid in the surface layer, strongly acid to neutral in the part of the subsoil above the fragipan, strongly acid to mildly alkaline in the fragipan, and neutral to moderately alkaline in the substratum
Surface runoff: Moderately rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for row crops, alfalfa, hay, or pasture. The row crops are grown in support of dairy farming. Some of the acreage is woodland or is idle land that is reverting to brush and shrubs.

This soil is moderately well suited to cultivated crops. If a drainage system is installed, the soil can be used for many crops, including corn, small grain, and alfalfa. The seasonal wetness can delay planting for a short period in spring. Erosion is a serious hazard on long slopes and in intensively cultivated areas. Contour farming and stripcropping in combination with diversions or grassed waterways help to control erosion.

Incorporating crop residue into the soil, rotating crops, minimizing tillage, and growing cover crops help to maintain tilth, control erosion, and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing is a major concern in managing pasture because it can damage the pasture plants. Grazing when the soil is wet early in spring can result in surface compaction, damage to the pasture, and severe erosion. Rotating livestock grazing, using proper stocking rates, controlling weeds and brush, and deferring grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the fragipan and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

MdB—Mardin channery silt loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on convex hilltops and on side slopes that receive runoff from the higher adjacent soils. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 1 inch; very dark gray channery silt loam

Subsoil:

1 to 14 inches; yellowish brown, friable channery silt loam; 15 percent channery fragments

14 to 18 inches; pale brown, mottled, friable channery silt loam; 15 percent channery fragments

18 to 32 inches; a fragipan of dark brown, mottled, firm channery silt loam; 25 percent channery fragments

32 to 45 inches; a fragipan of dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

45 to 72 inches; dark brown, mottled, firm channery silt loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Volusia soils along drainageways and in seepage spots; Chautauqua soils, which do not have a firm fragipan; and Schuyler soils, which do not have a firm fragipan and have more clay in the subsoil than the Mardin soil. Also included are small areas of Mardin soils that do not have channery fragments in the surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the part of the subsoil above the fragipan and slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid above the fragipan, very strongly acid to slightly acid in the fragipan, and strongly acid to neutral in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage has been cleared and is used for row crops grown in support of dairy farming. The rest is woodland, pasture, or idle land.

This soil is well suited to most of the crops commonly grown in the county. The surface layer has many flat stone fragments, which interfere with tillage and harvesting but do not prevent cultivation. Draining the wetter included soils by random tile drains allows for earlier planting and more uniform management of the fields. Liberal applications of lime are needed if legumes are to be established. Erosion is a hazard on long slopes and in intensively cultivated areas. Farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Minimizing tillage, growing

cover crops, incorporating crop residue into the soil, and mulching increase the rate of water infiltration during the growing season and help to maintain tilth.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. The soil becomes compacted if the pasture is grazed during wet periods. Overgrazing and surface compaction restrict plant growth, damage pasture plants, and increase the runoff rate. Applying a sufficient amount of lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The perched seasonal high water table is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the fragipan and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIw.

MdC—Mardin channery silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and moderately well drained. It is on hillsides and side slopes that receive runoff from the higher adjacent soils. Individual areas are rectangular and range from 5 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 1 inch; very dark gray channery silt loam

Subsoil:

1 to 14 inches; yellowish brown, friable channery silt loam; 15 percent channery fragments

14 to 18 inches; pale brown, mottled, friable channery silt loam; 15 percent channery fragments

18 to 32 inches; a fragipan of dark brown, mottled, firm channery silt loam; 25 percent channery fragments

32 to 45 inches; a fragipan of dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

45 to 72 inches; dark brown, mottled, firm channery silt loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Volusia soils along drainageways and in seepage spots; Chautauqua soils, which do not have a firm fragipan; Schuyler soils, which do not have a firm fragipan and have more clay in the subsoil than the Mardin soil; and Mardin soils that do not have channery fragments in the surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the part of the subsoil above the fragipan and slow in the fragipan and substratum

Available water capacity: Moderate

Soil reaction: Very strongly acid to moderately acid above the fragipan, very strongly acid to slightly acid in the fragipan, and strongly acid to neutral in the substratum

Surface runoff: Moderately rapid

Hazard of erosion: Moderate

Water table: Perched at a depth of 1.5 to 2.0 feet from March through May

Flooding: None

Depth to bedrock: More than 6 feet

Most of the acreage has been cleared and is used for row crops grown in support of dairy farming. The rest is woodland, pasture, or idle land.

This soil is moderately well suited to row crops if erosion and runoff are controlled. The surface layer has many flat stone fragments, which interfere with tillage and harvesting but do not prevent cultivation. Draining the wetter included soils by random tile drains allows for earlier planting and more uniform management of the fields. Liberal applications of lime are needed if legumes are to be established. Erosion is a hazard on long slopes and in intensively cultivated areas. Farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and mulching increase the rate of water infiltration

during the growing season and help to maintain tilth. Areas where conservation practices cannot be applied are better suited to deep-rooted legumes than to cultivated crops.

This soil is well suited to pasture. Overgrazing is the main concern in managing pasture because it can damage pasture plants. Grazing when the soil is wet early in spring can result in surface compaction, damage to the pasture, and severe erosion. Rotating livestock grazing, using proper stocking rates, controlling weeds and brush, and deferring grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the fragipan and substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

MdD—Mardin channery silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and moderately well drained. It is on smooth hillsides and valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or long and narrow and range from 10 to 40 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 1 inch; very dark gray channery silt loam

Subsoil:

1 to 14 inches; yellowish brown, friable channery silt loam; 15 percent channery fragments

14 to 18 inches; pale brown, mottled, friable channery silt loam; 15 percent channery fragments

18 to 32 inches; a fragipan of dark brown, mottled, firm channery silt loam; 25 percent channery fragments

32 to 45 inches; a fragipan of dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

45 to 72 inches; dark brown, mottled, firm channery silt loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Volusia soils along drainageways and at the base of slopes, where seepage water comes to the surface; Schuyler soils, which are finer textured than the Mardin soil; Chautauqua soils, which do not have a firm fragipan; and Valois soils, which are friable, do not have a fragipan, and are along the lower sides of valleys. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the part of the subsoil above the fragipan and slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid above the fragipan, very strongly acid to slightly acid in the fragipan, and strongly acid to neutral in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay, pasture, or row crops.

This soil is poorly suited to cultivated crops because of the slope and the severe hazard of erosion. The slope limits the use of farm equipment. Tillage is slightly delayed in spring because of the wetness. Channery fragments on the surface interfere with tillage and cause excessive wear on machinery. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Growing cover crops, minimizing tillage, and establishing diversions that break up long slopes and divert excess runoff help to control erosion. Where the slope permits, farming on the contour and stripcropping

are suitable. Because tilling the soil is difficult and erosion is a hazard, long-term sod crops are more practical than most other crops. A large amount of lime and fertilizer is needed to maintain good crop growth.

This soil is generally better suited to hay and pasture than to cultivated crops. Grazing when the soil is wet and overgrazing are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damage to the pasture. Overgrazing increases the hazard of erosion. Plowing across the slope and leaving strips of sod help to control erosion when an area is reseeded. Rotating livestock grazing, using proper stocking rates, controlling weeds and brush, deferring grazing when the soil is wet, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is moderate because of the slope. The hazards of erosion and windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The seasonal wetness and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings. Land grading and shaping help to overcome the slope.

Frost action, the seasonal wetness, and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness, the slope, and the slow permeability are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope. Installing a subsurface drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

Me—Middlebury silt loam. This soil is nearly level, very deep, and moderately well drained. It is in areas of lowland on flood plains adjacent to the major streams. Individual areas generally are oblong and are parallel to the adjacent streams. They range from 5 to 50 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; dark grayish brown silt loam

Subsoil:
6 to 18 inches; dark brown, friable very fine sandy loam
18 to 21 inches; brown, friable fine sandy loam
21 to 43 inches; grayish brown, mottled, friable loam

Substratum:
43 to 72 inches; grayish brown and yellowish brown loamy sand

Included in mapping are small areas of the somewhat poorly drained Holderton soils in slight depressions and old meander scars and small areas of the well drained Tioga soils in the slightly higher positions on the landscape. Also included are small areas of Fluvaquents and Udifluvents, which consist of unconsolidated alluvial deposits, and small areas of soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum
Available water capacity: High
Soil reaction: Strongly acid to slightly acid in the surface layer and moderately acid to neutral in the subsoil and substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 1.5 to 2.0 feet from November through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land or woodland, which generally is in isolated areas that cannot be easily farmed. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops. Flooding can delay planting or damage crops in some years, but

it usually is not a problem. The seasonal high water table can delay planting in spring, especially in low areas. The wetness can be reduced by installing subsurface drains in areas where outlets are available. If the wet included areas are drained, the fields can be managed more uniformly. The soil has a stone-free surface layer and can be easily tilled. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as growing cover crops, incorporating crop residue into the soil, growing sod crops, and minimizing tillage. Deep-rooted perennial crops, such as alfalfa, grow especially well. Measures that protect streambanks are needed in some areas to prevent lateral erosion in the fields.

Hay and pasture plants grow well on this soil. Overgrazing and grazing when the soil is wet can cause surface compaction, restrict plant growth, and deplete the stand of pasture plants. Using proper stocking rates, rotating livestock grazing, controlling brush and weeds, and deferring livestock grazing early in spring are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazards of erosion and windthrow and the equipment limitation are slight, and the seedling mortality rate is low. Planting seedlings early in spring, when the soil is moist, helps to ensure their survival.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding. Adding fill material, installing drains around footings, and sealing foundations and basement walls help to prevent excessive wetness in basements.

The hazard of flooding, the seasonal wetness, and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material increases soil strength and reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding and helps to overcome the wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Building on raised fill material helps to overcome the wetness and reduces the hazard of flooding.

This soil is an excellent source of topsoil.

The capability subclass is IIw.

Mn—Minoa fine sandy loam. This soil is nearly level, very deep, and somewhat poorly drained. It is on broad flats on lake plains and in areas of lowland in the larger valleys. Individual areas are oblong or irregularly shaped and range from 5 to 30 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 5 inches; dark brown fine sandy loam

Subsoil:
5 to 12 inches; yellowish brown, mottled, friable fine sandy loam
12 to 35 inches; dark yellowish brown, mottled, friable fine sandy loam

Substratum:
35 to 48 inches; brown, mottled, friable very fine sandy loam
48 to 72 inches; dark brown silt loam

Included in mapping are small areas of the poorly drained Lamson soils in slight depressions and along drainageways and small areas of the moderately well drained Elnora soils on small knolls and in the slightly higher positions on the landscape. Also included are small areas of soils that are similar to the Minoa soil but have coarser sand in the subsoil and soils that have a surface layer of silt loam. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to moderately alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from February through April
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, small fruit, or vineyards. Some areas are used for row crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can

delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to most of the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Because of the sandy substratum, drains do not have to be closely spaced. Generally, this stone-free soil can be easily tilled, but tilth and soil structure deteriorate if the soil is plowed when wet. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling brush and weeds, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material, installing roadside drainage systems, and building on raised fill material help to overcome these limitations.

The wetness is the main limitation on sites for septic tank absorption fields, particularly in early spring. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Sloughing and the caving in of the unstable sandy material are limitations affecting excavations.

The capability subclass is IIIw.

NgA—Niagara silt loam, 0 to 3 percent slopes, loamy substratum. This soil is nearly level, very deep, and somewhat poorly drained. It is mainly in low areas on lake plains and to a lesser extent on broad flats in the larger valleys. Individual areas are oblong or irregularly shaped. They generally range from 10 to 75 acres in size, but some are as large as 200 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; dark brown silt loam

Subsurface layer:
12 to 15 inches; pale brown, mottled, friable silt loam

Subsoil:
15 to 37 inches; dark brown, mottled, firm silty clay loam

Substratum:
37 to 45 inches; brown, firm silt loam
45 to 60 inches; light olive brown, light olive gray, and strong brown silt loam
60 to 72 inches; dark gray gravelly loam; 20 percent gravel

Included in mapping are small areas of the poorly drained Canandaigua soils in slight depressions and along drainageways; Rhinebeck soils, which have more clay in the subsoil than the Niagara soil; Churchville soils, which have glacial till within a depth of 40 inches; and Barcelona soils, which have bedrock at a depth of 4 to 6 feet. Also included are small areas of Niagara soils that have a gravelly substratum. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for row crops, vegetables, orchards, small fruit, or vineyards. Some of the acreage is used for row crops grown in support of dairy farming, is idle land, or is woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is

installed, the soil is suited to most of the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Tile drains should be closely spaced because of the moderately slow permeability. The soil is subject to puddling and compaction if it is tilled when wet. Growing cover crops, minimizing tillage, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, and minimize crusting and clodding.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the slow permeability.

The capability subclass is IIIw.

NgB—Niagara silt loam, 3 to 8 percent slopes, loamy substratum. This soil is gently sloping, very deep, and somewhat poorly drained. It is mainly in low areas on lake plains and to a lesser extent on broad flats in the larger valleys. Individual areas are oblong or irregularly shaped. They commonly range from 10 to 75 acres in size, but some are as large as 100 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; dark brown silt loam

Subsurface layer:
12 to 15 inches; pale brown, mottled, friable silt loam

Subsoil:
15 to 37 inches; dark brown, mottled, firm silty clay loam

Substratum:
37 to 45 inches; brown, firm silt loam
45 to 60 inches; light olive brown, light olive gray, and strong brown silt loam
60 to 72 inches; dark gray gravelly loam; 20 percent gravel

Included in mapping are small areas of the poorly drained Canandaigua soils in slight depressions and along drainageways; Rhinebeck soils, which have more clay in the subsoil than the Niagara soil; Churchville soils, which have glacial till within a depth of 40 inches; and Barcelona soils, which have bedrock at a depth of 4 to 6 feet. Also included are small areas of Niagara soils that have a gravelly substratum. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and moderately slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, moderately acid to mildly alkaline in the subsoil, and neutral to moderately alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for row crops, vegetables, orchards, small fruit, or vineyards. Some of the acreage is used for row crops grown in support of dairy farming, is idle land, or is woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is

installed, the soil is suited to most of the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Tile drains should be closely spaced because of the restricted permeability. Erosion is a hazard in intensively cultivated areas on long slopes. The soil is subject to puddling and compaction if it is tilled when wet. Growing cover crops, minimizing tillage, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, and minimize crusting and clodding.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIw.

OnD—Onoville silt loam, 10 to 25 percent slopes. This soil is strongly sloping and moderately steep, very deep, and moderately well drained. It is on valley sides and colluvial side slopes that receive runoff from the higher adjacent soils. It is at the higher elevations, where the mean annual air temperature is less than 47 degrees F. Individual areas are oblong or long and narrow and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 2 inches; dark grayish brown silt loam

Subsoil:
- 2 to 17 inches; yellowish brown, friable silt loam
- 17 to 24 inches; a fragipan of yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments
- 24 to 38 inches; a fragipan of yellowish brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:
- 38 to 72 inches; yellowish brown gravelly silt loam; 30 percent gravel

Included in mapping are small areas of somewhat poorly drained soils along drainageways and in seepage spots; Carrollton soils, which have shale bedrock within a depth of 40 inches; and the well drained Kinzua soils, which do not have a firm fragipan. Also included are small areas of soils that have a channery surface layer and soils that are less sloping than the Onoville soil. Included areas make up about 15 to 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the part of the subsoil above the fragipan and slow or moderately slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1.5 to 2.0 feet from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay or pasture. A few areas are used for row crops grown in support of dairy farming.

This soil is poorly suited to cultivated crops because of the slope and the severe hazard of erosion. The slope limits the use of farm equipment. Tillage is slightly delayed in spring because of the wetness. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Growing cover crops, minimizing tillage, and

establishing diversions that break up long slopes and divert excess runoff help to control erosion. Where the slope permits, farming on the contour and stripcropping are suitable. Because tilling the soil is difficult and erosion is a hazard, long-term sod crops are more practical than other crops. A large amount of lime and fertilizer is needed to maintain good crop growth.

This soil generally is better suited to hay and pasture than to cultivated crops. Grazing when the soil is wet and overgrazing are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damage to the pasture. Overgrazing increases the hazard of erosion. Plowing across the slope and leaving strips of sod help to control erosion when an area is reseeded. Rotating livestock grazing, using proper stocking rates, controlling weeds and brush, deferring grazing when the soil is wet, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazard of erosion is moderate because of the slope. The equipment limitation and the hazard of windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The seasonal wetness and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings. Land grading and shaping help to overcome the slope.

Frost action, the seasonal wetness, and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome the wetness and reduce the potential for frost action.

The seasonal wetness, the slope, and the slow permeability are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope. Installing a subsurface drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

OrA—Orpark silt loam, 0 to 3 percent slopes. This soil is nearly level, moderately deep, and somewhat poorly drained. It is on flat ledges and ridge crests in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. Individual areas are elongated and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches; dark grayish brown silt loam

Subsoil:
3 to 7 inches; dark brown, friable silt loam
7 to 13 inches; light yellowish brown, mottled, friable silt loam
13 to 26 inches; dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
26 inches; siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Hornell soils, which contain more clay than the Orpark soil. Also included are small areas of Fremont soils, which are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow or slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. It is limited by the seasonal wetness, the content of clay

in the subsoil, and low natural fertility. Installing subsurface drains can be difficult because of the moderate depth to bedrock. Plowing at the proper moisture content is important because the subsoil tends to develop poor tilth and become cloddy if the soil is tilled when wet. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Orpark soils. Liberal applications of fertilizer and lime commonly are required for optimum crop growth. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant grasses and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing restricts plant growth and can damage pasture plants. Grazing when the soil is wet results in compaction and puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazards of erosion and windthrow are slight. The seasonal wetness limits the use of equipment and increases the seedling mortality rate.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the potential for frost action and the wetness.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIIw.

OrB—Orpark silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and somewhat poorly drained. It is on side slopes and ridge benches in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches; dark grayish brown silt loam

Subsoil:
3 to 7 inches; dark brown, friable silt loam
7 to 13 inches; light yellowish brown, mottled, friable silt loam
13 to 26 inches; dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
26 inches; siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Hornell soils, which contain more clay than the Orpark soil. Also included are small areas of Fremont soils, which are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow or slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring,

harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a hazard on long slopes that are intensively cultivated. If a drainage system is installed, the soil is suited to many of the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, liberal applications of fertilizer and lime are needed.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and restricts plant growth. Overgrazing can deplete the stand of pasture grasses and thus result in serious erosion and in puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazards of erosion and windthrow are slight. The seasonal wetness limits the use of equipment and increases the seedling mortality rate.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the potential for frost action and the wetness.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIIw.

OrC—Orpark silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and somewhat poorly drained. It is on valley sides and hillsides in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches; dark grayish brown silt loam

Subsoil:
3 to 7 inches; dark brown, friable silt loam
7 to 13 inches; light yellowish brown, mottled, friable silt loam
13 to 26 inches; dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
26 inches; siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in slight depressions and small areas of Hornell soils, which have more clay than the Orpark soil. Also included are small areas of Fremont soils, which are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow or slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. Some areas close to lake plains are used for vegetables or vineyards.

This soil is moderately well suited to most of the crops commonly grown in the county. Unless a drainage system is installed, planting is delayed in spring, harvesting may be difficult in fall, and the soil can be used only for short-season annual crops, hay, or pasture. Erosion is a hazard on long slopes that are intensively cultivated. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff, and tile and open-ditch drainage systems can remove excess water. Installing subsurface drainage systems is difficult because of the underlying bedrock. Contour farming and stripcropping in combination with diversions, terraces, or grassed waterways help to control runoff and erosion. Rotating crops, incorporating crop residue into the soil, minimizing tillage, and growing cover crops help to maintain tilth and increase the content of organic matter. Because of natural acidity and low fertility, the soil requires liberal applications of fertilizer and lime.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and restricts plant growth. Overgrazing can deplete the stand of pasture grasses and thus result in serious erosion and in puddling. Plants respond well to applications of lime and fertilizer. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazards of erosion and windthrow are slight. The seasonal wetness limits the use of equipment and increases the seedling mortality rate. Establishing logging roads and skid trails across the slope helps to prevent gullying.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the potential for frost action and the wetness.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

OrD—Orpark silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately deep, and somewhat poorly drained. It is on valley sides that commonly are dissected by V-shaped gullies. It is in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 3 inches; dark grayish brown silt loam

Subsoil:
3 to 7 inches; dark brown, friable silt loam
7 to 13 inches; light yellowish brown, mottled, friable silt loam
13 to 26 inches; dark yellowish brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
26 inches; siltstone

Included in mapping are small areas of poorly drained soils along drainageways and in seepage spots and small areas of Hornell soils, which have a higher content of clay in the subsoil than the Orpark soil. Also included are small areas of Fremont and Schuyler soils, which are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and moderately slow or slow in the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Severe

Water table: Perched at a depth of 0.5 foot to 1.5 feet from November through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most areas are used as woodland. Some of the acreage is used for hay or pasture or is idle land that is reverting to woodland.

This soil is poorly suited to cultivated crops because of the severe hazard of erosion and the slope. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Intercepting and diverting runoff and subsurface seepage, establishing sod waterways, farming on the contour, and minimizing tillage reduce the wetness and the hazard of erosion. The content of organic matter has been depleted as a result of past erosion. The soil tends to become cloddy if plowed when wet. Incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter. The slope and the gullies in some areas limit the use of farm machinery.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing and grazing when the soil is wet restrict plant growth and can damage pasture plants. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs. Because the soil is naturally acid, applications of lime and fertilizer are needed to improve the growth of most pasture plants.

The potential productivity of this soil for northern red oak is moderately high. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness. Building logging roads and skid trails on the contour helps to control erosion and minimizes gullying along the trails.

The slope, the seasonal wetness, and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Extensive land shaping may be necessary to overcome the slope. Although excavation is costly, the bedrock generally can be ripped with a backhoe. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the potential for frost action and the wetness. Land grading helps to overcome the slope.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

Pa—Palms muck. This organic soil is nearly level, very deep, and very poorly drained. It is in basinlike areas, bogs, and swamps on the lowest parts of the landscape. Most areas are adjacent to lakes. Individual areas are circular or oblong. They commonly are 10 to 50 acres in size but range from 10 to several hundred acres. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 11 inches; black sapric material

Subsurface layer:
11 to 18 inches; very dark gray sapric material
18 to 36 inches; black sapric material

Substratum:
36 to 72 inches; dark gray silty clay loam

Included in mapping are small areas of Carlisle soils, which are organic to a depth of more than 51 inches; Canandaigua soils, which have a silty subsoil; Lamson soils, which have a sandy subsoil; and Alden soils, in which gravel and stones are mixed with mineral material. Carlisle soils are near the center of the mapped areas. The mineral included soils generally occur as narrow bands around the edges of the mapped areas and on slight rises within the areas. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderately slow to moderately rapid in the organic material and moderately slow or moderate in the mineral substratum
Available water capacity: High

Soil reaction: Strongly acid to mildly alkaline in the organic material and slightly acid to moderately alkaline in the mineral substratum
Surface runoff: Very slow
Hazard of erosion: Slight
Water table: As much as 1 foot above the surface or within a depth of 1 foot from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas support cattails and water-tolerant grasses, sedges, brush, and trees. Some areas are cultivated or are used for hay or pasture.

In undrained areas this soil is not suited to farming. It is permanently wet. Draining the soil is extremely difficult. If a drainage system is installed, the soil is well suited to many crops, particularly vegetables. A system of open ditches and subsurface drains commonly is needed. After it is drained, the soil shrinks and settles as a result of compaction, decomposition, and wind erosion. Controlled drainage commonly is needed to accommodate the needs of crops for moisture and to reduce the amount of shrinkage and the rate of decomposition. Intensively used areas are highly susceptible to wind erosion. Windbreaks and cover crops or sod crops reduce the extent of soil loss and crop damage.

Undrained areas commonly are poorly suited to hay and pasture. Surface compaction and trampling of the pasture are serious management concerns if these areas are grazed.

The potential productivity of this soil for red maple is moderate. Because of prolonged wetness and low soil strength, operating logging equipment is extremely difficult. The hazard of erosion is slight, the seedling mortality rate is high, and the hazard of windthrow is severe. The only seedlings that can be grown are those that can withstand extreme wetness. Most of the trees are established on windthrow mounds.

Prolonged wetness, excess humus, frequent ponding, compressibility, and frost action are severe limitations on sites for dwellings with basements, for local roads and streets, and for septic tank absorption fields.

Many areas are suited to wetland wildlife habitat.

The capability subclass is Vw.

Pg—Pits, gravel. This unit consists of areas from which sand and gravel have been removed. The sand and gravel are still excavated in most of the pits. The sides of the pits generally are steep, and the floor generally is level. Scattered piles of stones and boulders and sloughed material commonly are on the floor. Small pools of water are common in low areas in some of the pits, particularly in spring. The excavated areas commonly are circular. They range from 5 to 30 acres in size.

The pits generally do not support vegetation, but some of the older ones support scattered bushes and grasses. Because the soil material is droughty and very low in natural fertility, the vegetation commonly is sparse and its growth is stunted. Permeability varies. It is mainly moderately rapid or rapid. The water table is at various depths.

The pits generally are not suitable for farming or woodland because the topsoil has been removed and the subsoil material is not suitable for root development. The potential for wildlife habitat commonly is poor, although some small animals and birds may use the pits for shelter and refuge. Onsite investigation is needed to determine the potential for any proposed use and the limitations affecting that use.

No capability subclass is assigned.

Po—Pompton silt loam. This soil is nearly level, very deep, and moderately well drained. It is on outwash terraces and in areas of deltaic deposits. Individual areas are elongated or irregularly shaped and range from 5 to 50 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; dark grayish brown silt loam

Subsoil:
10 to 22 inches; brown, friable gravelly sandy loam; 20 percent gravel
22 to 34 inches; dark yellowish brown, mottled, friable gravelly sandy loam; 25 percent gravel

Substratum:
34 to 72 inches; brown gravelly loamy sand; 25 percent gravel

Included in mapping are small areas of the somewhat poorly drained Red Hook soils in slight depressions and along drainageways, the well drained and somewhat excessively drained Chenango soils on small knolls and in the slightly higher positions on the landscape, and soils that have a channery or gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and rapid in the substratum
Available water capacity: Moderate

Soil reaction: Very strongly acid or strongly acid throughout the profile
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 1 to 2 feet from October through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops grown in support of dairy farming. Some areas are used for vegetables or small fruit. Scattered woodlots are in a few areas. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops, but the seasonal wetness may briefly delay tillage in spring. Draining wet spots permits more uniform management of the fields. If a sufficient amount of lime and fertilizer is applied, deep-rooted perennial crops, such as alfalfa, grow especially well. Minimizing tillage, incorporating crop residue into the soil, growing cover crops, and including grasses and legumes in the cropping system help to maintain tilth and increase the content of organic matter. Increasing the content of organic matter improves the available water capacity of the soil.

This soil is well suited to pasture. Overgrazing is a major concern in managing pasture because it can damage the pasture plants. Grazing when the soil is wet early in spring can result in surface compaction and damage to the pasture. Topdressing with lime and fertilizer, using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and deferring grazing when the soil is wet help to maintain high-quality pasture.

The potential productivity of this soil for pin oak is moderately high. The hazard of erosion is slight, and the seedling mortality rate is moderate. Seedlings should be planted early in spring, when the soil is moist. The seasonal wetness limits the use of logging equipment and increases the hazard of windthrow.

The seasonal wetness is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and a poor filtering capacity are the main limitations on sites for septic tank absorption fields. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum. Installing a drainage system in the area around the absorption fields helps to overcome the wetness.

This soil is a potential source of sand and gravel.

The capability subclass is IIw.

RaA—Raynham silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on broad flats on lake plains and in low areas in the larger valleys. Individual areas are irregular in shape. They generally range from 10 to 75 acres in size, but some are as large as 200 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 12 inches; dark brown, friable silt loam
12 to 24 inches; grayish brown, distinctly mottled, friable silt loam

Substratum:
24 to 72 inches; grayish brown, distinctly mottled, firm silt loam

Included in mapping are small areas of poorly drained soils in slight depressions and along drainageways; the moderately well drained Scio soils on small knolls and in the slightly higher positions on the landscape; Swormville soils, which are underlain by sandy deposits; and Red Hook soils, which have gravelly layers in the subsoil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow to moderate in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 2.0 feet from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, or vineyards. Some areas are used for row crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where adequate outlets are available. This stone-free soil generally can be easily tilled, but tilth and soil structure deteriorate if the soil is plowed when wet. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

RaB—Raynham silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on broad flats on lake plains and in low areas in the larger valleys. Individual areas are irregular in shape and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 12 inches; dark brown, friable silt loam
12 to 24 inches; grayish brown, distinctly mottled, friable silt loam

Substratum:
24 to 72 inches; grayish brown, distinctly mottled, firm silt loam

Included in mapping are small areas of poorly drained soils in slight depressions and along drainageways and small areas of the moderately well drained Scio soils on small knolls and in the slightly higher positions on the landscape. Also included are small areas of Swormville soils, which are underlain by sandy deposits, and small areas of Red Hook soils, which have gravelly layers in the subsoil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow to moderate in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 2.0 feet from November through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, or vineyards. Some areas are used for row crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Generally, this stone-free soil can be easily tilled, but tilth and soil structure deteriorate if

the soil is plowed when wet. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling brush and weeds, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate and the hazard of windthrow. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

Rf—Raynham silt loam, flooded. This soil is nearly level, very deep, and somewhat poorly drained. It is in low areas in the major valleys and is subject to flooding. Individual areas are slightly elongated and range from 10 to 50 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; very dark grayish brown silt loam

Subsoil:
7 to 12 inches; dark brown, friable silt loam
12 to 24 inches; grayish brown, distinctly mottled, friable silt loam

Substratum:
24 to 72 inches; grayish brown, distinctly mottled, firm silt loam

Included in mapping are small areas of poorly drained soils in slight depressions and along drainageways; the moderately well drained Scio soils on small knolls and in the slightly higher positions on the landscape; Swormville soils, which are underlain by sandy deposits; and Red Hook soils, which have gravelly layers in the subsoil. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow to moderate in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 2.0 feet from November through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for row crops grown in support of dairy farming. Some of the acreage is woodland or is idle land that is reverting to woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Flooding can delay planting or damage crops in some years. The seasonal high water table can delay tillage and can make planting and harvesting difficult, especially in low areas. The wetness can be reduced by installing subsurface drains in areas where adequate outlets are available. If a drainage system is installed, the soil is well suited to most of the crops commonly grown in the county. The soil has a stone-free surface layer and can be easily tilled. Minimizing tillage, incorporating crop residue into the soil, and growing cover crops and occasional sod crops help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting

grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding. Adding fill material, installing drains around footings, and sealing foundations and basement walls help to prevent excessive wetness in basements.

The hazard of flooding, the seasonal wetness, and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding and helps to overcome the wetness.

The hazard of flooding, the seasonal wetness, and the restricted permeability are the main management concerns on sites for septic tank absorption fields. Adding permeable fill material reduces the hazard of flooding and helps to overcome the wetness and the slow permeability.

The capability subclass is IIIw.

Rh—Red Hook silt loam. This soil is nearly level, very deep, and somewhat poorly drained. It is on low flats on outwash plains and the older stream terraces. Individual areas are oblong or irregularly shaped and range from 10 to 50 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; very dark grayish brown silt loam

Subsoil:

10 to 19 inches; grayish brown, distinctly mottled, friable loam

19 to 32 inches; yellowish brown, mottled, friable fine sandy loam; 15 percent gravel

Substratum:

32 to 72 inches; dark grayish brown very gravelly sandy loam; 40 percent gravel

Included in mapping are small areas of the very poorly drained Halsey soils in slight depressions and along drainageways and small areas of the moderately well drained Pompton soils on small knolls and in the slightly higher positions on the landscape. Also included are small areas of Red Hook soils that have a thin mantle of gravel-free silty material or that have a channery or gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately slow or moderate in the substratum

Available water capacity: Moderate

Soil reaction: Strongly acid to slightly acid in the surface layer, moderately acid to neutral in the subsoil, and moderately acid to moderately alkaline in the substratum

Surface runoff: Slow

Hazard of erosion: Slight

Water table: At a depth of 0.5 foot to 1.5 feet from December through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, or vineyards. Some areas are used for row crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Generally, this stone-free soil can be easily tilled, but tilth and soil structure deteriorate if the soil is plowed when wet. Minimizing tillage, growing cover crops, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth and increase the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for red maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites

for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

The capability subclass is IIIw.

RnA—Rhinebeck silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is mainly in low areas on lake plains and to a lesser extent on broad flats in the larger valleys. Individual areas are oblong and range from 10 to 75 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 8 inches; brown silt loam

Subsurface layer:
8 to 15 inches; grayish brown, mottled, friable silt loam

Subsoil:
15 to 27 inches; yellowish brown, distinctly mottled, firm silty clay loam
27 to 44 inches; yellowish brown, mottled, firm silty clay loam

Substratum:
44 to 72 inches; dark brown silt, clay, and fine sand

Included in mapping are small areas of the poorly drained Canadice soils in slight depressions and along drainageways; Canandaigua soils, which have less clay in the subsoil than the Rhinebeck soil and are in slight depressions; and the moderately well drained Collamer soils on small knolls and slight rises. Also included are small areas of Churchville soils, which have glacial till within a depth of 40 inches, and small areas of Barcelona soils, which have bedrock at a depth of 4 to 6 feet. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderately slow in the surface layer and subsurface layer and slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsurface layer, strongly acid to mildly alkaline in the subsoil, and slightly acid to moderately alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from January through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for row crops, vegetables, orchards, small fruit, or vineyards. Some of the acreage is used for row crops or hay grown in support of dairy farming, is idle land, or is woodland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. A combination of open ditches and subsurface drains generally is effective in areas where outlets are available. Tile drains should be closely spaced because of the restricted permeability. The soil is subject to puddling and compaction if it is tilled when wet. Growing cover crops, minimizing tillage, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, and minimize crusting and clodding.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazards of erosion and windthrow are slight, and the seedling mortality rate is low. The seasonal wetness limits the use of equipment.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, low soil strength, and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the wetness and the potential for frost action and increase soil strength.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the restricted permeability.

The capability subclass is IIIw.

RoF—Rock outcrop-Manlius complex, 35 to 70 percent slopes. This unit consists of rock ledges and a steep and very steep, moderately deep, well drained to excessively drained Manlius soil on the nearly perpendicular walls of gorges. The height of the walls, or the depth of most of the gorges, ranges from 50 to more than 200 feet. Most areas occur as elongated, narrow strips. They commonly range from 20 to 75 acres in size, but some are as large as 200 acres or more.

Rock outcrop makes up about 55 percent of this unit, and the Manlius soil makes up 30 percent. The Rock outcrop and Manlius soil occur in such an intricate pattern that it was not practical to separate them at the scale used in mapping.

The typical sequence, depth, and composition of the layers of the Manlius soil are as follows—

Surface layer:

0 to 3 inches; dark grayish brown channery silt loam

Subsoil:

3 to 7 inches; dark yellowish brown, friable channery silt loam; 25 percent channery fragments

7 to 12 inches; yellowish brown, friable channery silt loam; 30 percent channery fragments

12 to 21 inches; yellowish brown, friable very channery silt loam; 45 percent channery fragments

Substratum:

21 to 25 inches; yellowish brown, friable very channery silt loam; 60 percent channery fragments

Bedrock:

25 inches; shale

Included in mapping are small areas of soils that have bedrock at a depth of less than 20 or more than 40 inches. Also included are narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: Low
Soil reaction: Extremely acid to strongly acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of more than 6 feet
Depth to bedrock: 20 to 40 inches

All areas of this unit, except for those on exposed rock walls, support natural vegetation consisting of trees and brush. Some small trees and brush grow in the crevices of the rocks.

This unit has no potential for farming or urban uses because of the slope and the exposed bedrock. The gorges have esthetic value and can be used as scenic overlooks. Some areas are excellent sites for viewing geologic strata. Scattered stands of timber grow in some areas, but managing the stands is impractical because of the slope.

The capability subclass is VIIIs.

Sa—Saprists and Aquents, ponded. These level, very deep, very poorly drained soils commonly border lakes, ponds, and other bodies of water. They generally are called freshwater marsh. Shallow water is on the surface much of the year. The depth of the water on the soils fluctuates with the depth of the adjacent bodies of water. Individual areas are oblong or circular. They commonly range from 5 to 30 acres in size, but some are more than 75 acres. Slopes are 0 to 1 percent.

Saprists consist of black, decomposed sapric material 16 to 60 inches thick. The underlying mineral layers to a depth of 72 inches or more are gray or brown, mottled, sandy, silty, or loamy deposits that include varying amounts of gravel. These soils are ponded.

Aquents have a surface layer of black or gray, mottled, loamy or sandy material 5 to 10 inches thick. In some areas this layer has an organic deposit as much as 16 inches thick. The underlying layers to a depth of 72 inches are gray or brown, mottled, sandy, silty, or loamy deposits that include varying amounts of gravel.

Most areas of this unit are in natural depressions. Some areas are manmade or are the result of the construction of beaver dams. The dominant vegetation is cattails, rushes, and other water-tolerant, herbaceous

Figure 12.—An area of Saprists and Aquents, ponded, developed for improved wildlife habitat.

plants. Most areas do not support trees, but water-tolerant species are common in some areas.

Onsite investigation is needed to determine the feasibility of using a particular area. Most uses would require a drainage system. Draining these marshes generally is extremely difficult because the water level is controlled by the adjacent open bodies of water. Also, the marshes are so low on the landscape that adequate outlets are not available. Most areas provide excellent habitat for wetland wildlife, beaver, muskrat, fish, and waterfowl. In some areas the habitat can be improved by constructing islands, building nesting boxes, and planting food-producing wetland shrubs (fig. 12).

The capability subclass is VIIIw.

ShB—Schuyler silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is in convex areas on hilltops and the upper side slopes that receive little runoff from the higher adjacent soils. Individual areas are oblong

or circular and range from 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

3 inches to 0; partially decomposed leaves, twigs, and organic material

Subsoil:

0 to 9 inches; yellowish brown, friable silt loam

9 to 18 inches; dark yellowish brown, friable silt loam

18 to 29 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

29 to 38 inches; brownish gray, mottled, firm channery silty clay loam; 20 percent channery fragments

38 to 72 inches; brown, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Fremont soils in slight depressions and along drainageways; Chautauqua soils, which have less clay in the subsoil than the Schuyler soil; and Langford soils, which have a fragipan in the subsoil. Also included are small areas of Towerville soils, which have bedrock at a depth of 20 to 40 inches, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow in the substratum

Available water capacity: High

Soil reaction: Very strongly acid to moderately acid throughout the profile

Surface runoff: Medium

Hazard of erosion: Slight

Water table: Perched at a depth of 1.5 to 2.0 feet from March through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas are wooded or are used for row crops grown in support of dairy farming. Some of the acreage is idle land that is reverting to brush and shrubs. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county. Tillage is delayed by wetness in spring. Draining the wetter included soils allows for earlier planting and more uniform management of the fields. Liberal applications of lime are needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard on long slopes in intensively cultivated areas. Minimizing tillage, farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. The soil becomes compacted if it is grazed when wet. Overgrazing and surface compaction restrict plant growth, damage pasture plants, and increase the runoff rate. Applying a sufficient amount of lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The perched seasonal high water table is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIw.

ShC—Schuyler silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and moderately well drained. It is on hillsides and side slopes that receive runoff from the higher adjacent soils. Individual areas are rectangular and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
3 inches to 0; partially decomposed leaves, twigs, and organic material

Subsoil:
0 to 9 inches; yellowish brown, friable silt loam
9 to 18 inches; dark yellowish brown, friable silt loam
18 to 29 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:
29 to 38 inches; brownish gray, mottled, firm channery silty clay loam; 20 percent channery fragments
38 to 72 inches; brown, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Fremont soils in slight depressions and along drainageways; Chautauqua soils, which have less clay in the subsoil than the Schuyler soil; and Langford soils, which have a fragipan in the subsoil. Also included are small areas of Towerville soils, which have bedrock at a depth of 20 to 40 inches, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Moderately rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded or are used for row crops grown in support of dairy farming. Some of the acreage is idle land that is reverting to brush and shrubs.

This soil is well suited to most of the crops commonly grown in the county. Tillage is delayed by wetness in spring. Draining the wetter included soils allows for earlier planting and more uniform management of the fields. Liberal applications of lime are needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard on long slopes in intensively cultivated areas. Minimizing tillage, farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. The soil becomes compacted if it is grazed when wet. Overgrazing and surface compaction restrict plant growth, damage pasture plants, and increase the runoff rate. Applying a sufficient amount of lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness is the main limitation on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

ShD—Schuyler silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and moderately well drained. It is on smooth hillsides and valley sides that receive runoff from the higher adjacent soils. Individual areas are oblong or long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
3 inches to 0; partially decomposed leaves, twigs, and organic material

Subsoil:
0 to 9 inches; yellowish brown, friable silt loam

9 to 18 inches; dark yellowish brown, friable silt loam
18 to 29 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:
29 to 38 inches; brownish gray, mottled, firm channery silty clay loam; 20 percent channery fragments
38 to 72 inches; brown, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Fremont soils in slight depressions and along drainageways; Chautauqua soils, which have less clay in the subsoil than the Schuyler soil; and Langford soils, which have a fragipan in the subsoil. Also included are small areas of Towerville soils, which have bedrock at a depth of 20 to 40 inches, and small areas of soils that have a channery surface layer. Included areas make up about 10 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay or pasture. A small acreage is used for row crops.

This soil is poorly suited to cultivated crops because of the slope and the severe hazard of erosion. The slope limits the use of farm equipment. Tillage is slightly delayed by wetness in spring. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Minimizing tillage, growing cover crops, and establishing diversions that break up long slopes and divert excess runoff help to control erosion. Where the slope permits, farming on the contour and stripcropping are suitable. Because tilling the soil is difficult and erosion is a hazard, long-term sod crops are more practical than most other crops. A large amount of lime and fertilizer is needed to maintain good crop growth.

This soil generally is better suited to hay and pasture than to cultivated crops. Grazing when the soil is wet and overgrazing are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction and damage to the pasture. Overgrazing increases the hazard of erosion. Plowing across the slope and leaving strips of sod help to control erosion when an area is reseeded. Using proper stocking rates, rotating livestock grazing, applying a sufficient amount of lime and fertilizer, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of erosion are moderate because of the slope. The seedling mortality rate is low, and the hazard of windthrow is slight. Seedlings should be planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The seasonal wetness and the slope are the main limitations on sites for dwellings with basements. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements. Installing interceptor drains and diversion ditches in upslope areas diverts surface and subsurface water from the dwellings. Land grading and shaping help to overcome the slope.

Frost action, the seasonal wetness, and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the wetness and the potential for frost action.

The seasonal wetness, the slope, and the restricted permeability are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope. Installing a subsurface drainage system upslope from the absorption fields and adding permeable fill material help to overcome the wetness and the restricted permeability.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

ShE—Schuyler silt loam, 25 to 35 percent slopes. This soil is steep, very deep, and moderately well drained. It is on hillsides and valley sides that receive runoff from the higher adjacent soils. Many areas along the valleys are deeply dissected by V-shaped gullies. Individual areas are elongated or occur as narrow strips on the side slopes. They commonly are 20 to 75 acres in size but range from 10 to several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

3 inches to 0; partially decomposed leaves, twigs, and organic material

Subsoil:

0 to 9 inches; yellowish brown, friable silt loam

9 to 18 inches; dark yellowish brown, friable silt loam

18 to 29 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

29 to 38 inches; brownish gray, mottled, firm channery silty clay loam; 20 percent channery fragments

38 to 72 inches; brown, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Fremont soils along drainageways and in seepage spots; the well drained Chadakoin soils, which have less clay in the subsoil than the Schuyler soil; and Towerville soils, which have bedrock within a depth of 40 inches. Also included are small areas of soils that are similar to the Schuyler soil but are well drained. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded and provide wildlife habitat. Some of the less sloping areas are idle or are used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm equipment is very difficult because of the slope. A plant cover that controls runoff and erosion is essential.

The less sloping areas of this soil can be used as pasture on a limited basis. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Reseeding pastures is difficult because of the slope. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for sugar maple is moderate. The use of equipment is restricted by the slope. The seedling mortality rate is low, and the hazard of windthrow is slight. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope is the main limitation on sites for local roads and streets. Land grading and building on the contour help to overcome this limitation.

The slope and the restricted permeability in the substratum are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Extensive land modification is needed to overcome the slope.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIe.

ShF—Schuyler silt loam, 35 to 50 percent slopes. This soil is very steep, very deep, and moderately well drained. It is on hillsides and valley sides that receive runoff from the higher adjacent soils. Many areas along the valleys are deeply dissected by V-shaped gullies. Individual areas are elongated or occur as narrow strips on the side slopes. They commonly are 20 to 75 acres in size but range from 10 to several hundred acres.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

3 inches to 0; partially decomposed leaves, twigs, and organic material

Subsoil:

0 to 9 inches; yellowish brown, friable silt loam

9 to 18 inches; dark yellowish brown, friable silt loam

18 to 29 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Substratum:

29 to 38 inches; brownish gray, mottled, firm channery silty clay loam; 20 percent channery fragments

38 to 72 inches; brown, firm channery silty clay loam; 25 percent channery fragments

Included in mapping are small areas of the somewhat poorly drained Fremont soils along drainageways and in seepage spots; the well drained Chadakoin soils, which have less clay in the subsoil than the Schuyler soil; and Towerville soils, which have bedrock within a depth of 40 inches. Also included are small areas of soils that are similar to the Schuyler soil but are well drained and narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer, moderate or moderately slow in the subsoil, and slow in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid throughout the profile
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: Perched at a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded and provide wildlife habitat.

This soil is not suited to cultivated crops, hay, or pasture. The slope and the very severe hazard of erosion are the main management concerns. The soil is too steep for the safe operation of farm machinery. A plant cover that controls runoff and erosion is essential.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of erosion are severe. The seedling mortality rate is low, and the hazard of windthrow is slight. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

Construction is extremely difficult or impractical on this soil. The slope is the main limitation on sites for local roads and streets, dwellings with basements, and waste disposal systems. Erosion is a very severe hazard on construction sites. In most areas the native plant cover should not be removed.

The capability subclass is VIIe.

SoA—Scio silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and moderately well drained. It is on broad flats in the larger valleys and in lowland areas on lake plains. Individual areas are oblong or irregularly shaped and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; dark grayish brown silt loam

Subsoil:
9 to 21 inches; yellowish brown, friable silt loam
21 to 31 inches; dark yellowish brown, distinctly mottled, friable silt loam

Substratum:
31 to 48 inches; brown very fine sandy loam
48 to 72 inches; dark brown very gravelly loam; 45 percent gravel

Included in mapping are small areas of the somewhat poorly drained Raynham soils in slight depressions and along drainageways and small areas of the well drained Unadilla soils on small knolls and in the slightly higher positions on the landscape. Also included are small areas of Collamer soils, which have a higher content of clay in the subsoil than the Scio soil and are on lake plains, and a few spots of soils that have more stone fragments in the surface layer than the Scio soil. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 1.5 to 2.0 feet from March through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables (fig. 13), orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county, including vegetables and legumes. The seasonal high water table can delay tillage and planting in spring. Draining the wetter included soils allows for more efficient management of the fields. This gravel-free soil can be easily tilled and is well suited to specialty crops. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the

Figure 13.—Snap beans in an area of Scio silt loam, 0 to 3 percent slopes. The productive soils on lake plains are suited to vegetables.

soil, plowing only when the soil is at the proper moisture content, growing cover crops, and rotating crops.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing can damage pasture plants, and grazing when the soil is wet can compact the surface layer and seal the surface. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Sloughing and the caving in of the unstable silty material are limitations affecting excavations.

This soil is a good source of topsoil.

The capability subclass is IIw.

SoB—Scio silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and moderately well drained. It is on broad flats in the larger valleys and in lowland areas on lake plains. Individual areas are oblong or irregularly shaped and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 9 inches; dark grayish brown silt loam

Subsoil:

9 to 21 inches; yellowish brown, friable silt loam

21 to 31 inches; dark yellowish brown, distinctly mottled, friable silt loam

Substratum:

31 to 48 inches; brown very fine sandy loam

48 to 72 inches; dark brown very gravelly loam; 45 percent gravel

Included in mapping are small areas of the somewhat poorly drained Raynham soils in slight depressions and along drainageways and small areas of the well drained Unadilla soils on small knolls and in the slightly higher positions on the landscape. Also included are small areas of Collamer soils, which have a higher content of clay in the subsoil than the Scio soil and are on lake plains, and a few spots of soils that have more stone fragments in the surface layer than the Scio soil. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum

Available water capacity: High

Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum

Surface runoff: Slow

Hazard of erosion: Moderate

Water table: At a depth of 1.5 to 2.0 feet from March through May

Flooding: None

Depth to bedrock: More than 6 feet

Most areas on lake plains are used for vegetables, orchards, small fruit, or vineyards. Some areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land. Small woodlots are in some areas. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county, including vegetables and legumes. The seasonal high water table can delay tillage and planting in spring. Draining the wetter included soils allows for more efficient management of the fields. This gravel-free soil can be easily tilled and is well suited to specialty crops. If cultivated, it is highly erodible, especially where slopes are long. Measures that minimize surface crusting and compaction and reduce the hazard of erosion are needed. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter. Farming on the contour, minimizing tillage, stripcropping, and maintaining a year-round plant cover help to control erosion.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pasture plants, and grazing when the soil is wet causes surface compaction and seals the surface. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted in spring, when the moisture content is ideal for seedling survival.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Sloughing and the caving in of the unstable silty material are limitations affecting excavations.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

This soil is a good source of topsoil.

The capability subclass is IIe.

Sw—Swormville silt loam. This soil is nearly level, very deep, and somewhat poorly drained. It is mainly on broad flats in the larger valleys but is also in low areas on lake plains. Individual areas are oblong. They range mainly from 20 to 50 acres in size, but some are as large as 200 acres or more. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 10 inches; very dark grayish brown silt loam

Subsoil:

10 to 16 inches; grayish brown, mottled, friable silt loam

16 to 25 inches; yellowish brown, mottled, friable silt loam

Substratum:

25 to 30 inches; grayish brown loamy fine sand

30 to 72 inches; grayish brown sand; 10 percent gravel

Included in mapping are small areas of the poorly drained and very poorly drained Getzville soils in slight depressions and along drainageways; Minoa and Lamson soils, which are sandy throughout; and moderately well drained soils in the slightly higher positions on the landscape. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderately slow in the surface layer, slow or moderately slow in the subsoil, and moderately rapid in the substratum

Available water capacity: Moderate

Soil reaction: Strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and slightly acid to moderately alkaline in the substratum

Surface runoff: Slow

Hazard of erosion: Slight

Water table: At a depth of 0.5 foot to 1.5 feet from November through May

Flooding: None

Depth to bedrock: More than 6 feet

Most of the acreage is used for row crops grown in support of dairy farming. Some of the acreage is used for vegetables. The rest is idle land or woodland. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops and vegetables. The seasonal high water table can delay planting and can make harvesting difficult, especially in low areas. If a drainage system is installed, the soil is suited to most of the crops commonly grown in the county. In most areas where outlets are available, drainage can be improved by a combination of open ditches and subsurface drains. Because of the rapid permeability in the sandy substratum, tile drains do not have to be closely spaced. The soil is subject to puddling and compaction if it is tilled when wet. Growing cover crops, minimizing tillage, incorporating crop residue into the soil, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, and minimize surface crusting and clodding.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main management concerns. Overgrazing damages the pasture plants, and grazing when the soil is wet can result in surface compaction and damage to the pasture. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and restricting grazing when the soil is wet are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material, installing roadside drainage systems, and building on raised fill material help to overcome these limitations.

The wetness is a limitation on sites for septic tank absorption fields, particularly in early spring. Care is needed to prevent the contamination of ground water resulting from seepage. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness. Sloughing and the caving in of the unstable silty material are limitations affecting excavations.

This soil is a good source of topsoil.

The capability subclass is IIIw.

Te—Teel silt loam. This soil is nearly level, very deep, and moderately well drained. It is in low areas on flood plains along the major streams. Individual areas generally are oblong and are parallel to the adjacent streams. They range from 5 to 30 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; very dark grayish brown silt loam

Subsoil:

6 to 12 inches; dark yellowish brown, friable silt loam

12 to 19 inches; brown, friable silt loam

19 to 28 inches; yellowish brown, distinctly mottled, friable silt loam

Substratum:

28 to 42 inches; brown, mottled, friable silt loam

42 to 72 inches; grayish brown fine sandy loam

Included in mapping are small areas of the somewhat poorly drained Wakeville and poorly drained and very poorly drained Wayland soils in slight depressions and old meander scars and small areas of the well drained Hamlin soils in the slightly higher positions on the landscape. Also included are areas of Fluvaquents and Udifluvents, which consist of unconsolidated alluvial deposits. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Strongly acid to neutral to a depth of 30 inches and moderately acid to mildly alkaline below that depth
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 1.5 to 2.0 feet from January through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops grown in support of dairy farming. Some of the acreage is idle land or woodland, which generally is in small areas that are isolated and cannot be easily farmed. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops. Flooding can delay planting or damage crops in some years, but it usually is not a concern. The seasonal high water table can delay planting in spring, especially in low areas. The wetness can be reduced by installing subsurface drains in areas where outlets are available. If the wet included areas are drained, the fields can be managed more uniformly. This soil has a stone-free surface layer and can be easily tilled. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the soil, growing cover crops and sod crops, and minimizing tillage. Deep-rooted perennial crops, such as alfalfa, grow especially well. Measures that protect streambanks are needed in some areas to prevent lateral erosion in the fields.

Hay and pasture plants grow well on this soil. Overgrazing and grazing when the soil is wet can cause surface compaction, deplete the stand of pasture plants, and restrict plant growth. Using proper stocking rates, rotating grazing, controlling weeds and brush, and deferring grazing early in spring are the main management needs.

The potential productivity of this soil for sugar maple is moderately high. The hazard of erosion, the equipment limitation, and the hazard of windthrow are slight, and the seedling mortality rate is low. Planting seedlings early in spring, when the soil is moist, ensures their survival.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding. Adding fill material, installing drains around footings, and sealing foundations and basement walls help to prevent excessive wetness in basements.

The hazard of flooding, the seasonal wetness, and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding and helps to overcome the wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Care is needed to prevent the contamination of ground water resulting from seepage. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Building on raised fill material helps to overcome the wetness and reduces the hazard of flooding.

This soil is an excellent source of topsoil.

The capability subclass is IIw.

Tg—Tioga silt loam. This soil is nearly level, very deep, and well drained. It is in the higher positions on the flood plains along the major streams in the county. Individual areas generally are oblong and are parallel to the adjacent streams. They range from 5 to 50 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 11 inches; dark grayish brown silt loam

Subsoil:
11 to 26 inches; yellowish brown, friable silt loam
26 to 32 inches; dark yellowish brown, friable loam
32 to 38 inches; yellowish brown, friable gravelly loam

Substratum:
38 to 47 inches; brown very gravelly loam
47 to 72 inches; grayish brown very gravelly sandy loam

Included in mapping are small areas of the moderately well drained Middlebury and somewhat poorly drained Holderton soils in slight depressions and old drainageways and small areas of Hamlin soils, which have more silt in the subsoil than the Tioga soil. Also included are small areas of Fluvaquents and Udifluvents, which consist of unconsolidated alluvial deposits, and small areas of soils that have a gravelly surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate or moderately rapid in the surface layer and subsoil and moderate to rapid in the substratum
Available water capacity: High
Soil reaction: Strongly acid to neutral in the surface layer and subsoil and moderately acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 3 to 6 feet from February through April
Flooding: Rare
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops grown in support of dairy farming. Some of the acreage in scattered areas that cannot be easily farmed is idle land or woodland. This soil meets the requirements for prime farmland.

This soil is well suited to cultivated crops. Flooding is a hazard, but it generally occurs early in spring, before crops are planted. Deep-rooted perennial crops, such as alfalfa, grow especially well. The soil has a stone-free surface layer and can be easily tilled. If the wet included areas are drained, the fields can be managed more uniformly. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the soil, growing cover crops and occasional sod crops, and minimizing tillage. Measures that protect streambanks and improve channels are needed in places to protect the soil from flooding.

Hay and pasture plants grow well on this soil. Overgrazing can damage pasture plants and restrict plant growth. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and deferring grazing early in spring are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The hazard of erosion, the equipment limitation, and the hazard of windthrow are slight, and the seedling mortality rate is low. Planting seedlings early in spring, when the soil is moist, helps to ensure their survival.

The hazard of flooding is the main management concern on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding.

The hazard of flooding and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Adding fill material helps to overcome the wetness.

This soil is an excellent source of topsoil.

The capability class is I.

ToB—Towerville silt loam, 3 to 8 percent slopes. This soil is gently sloping, moderately deep, and moderately well drained. It is on convex hilltops and side slopes in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. Individual areas are long and narrow and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsoil:
12 to 22 inches; dark yellowish brown, friable channery silt loam; 15 percent channery fragments
22 to 30 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
30 inches; bedded siltstone

Included in mapping are small areas of the somewhat poorly drained Orpark soils along drainageways and in slight depressions and small areas of Hornell soils, which have more clay in the subsoil than the Towerville soil. Also included are small areas of Chautauqua soils, which have less clay in the subsoil than the Towerville soil and are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow or moderately slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 1.5 to 2.0 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for row crops grown in support of dairy farming. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county. Tillage is delayed by wetness in spring. Draining the wetter included soils allows for earlier planting and more uniform management of the fields. Installing subsurface drainage systems is difficult because of the moderate depth to bedrock. Liberal applications of lime are needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard on long slopes in intensively cultivated areas. Minimizing tillage, farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. The soil becomes compacted if it is grazed when wet. Overgrazing and surface compaction restrict plant growth and can damage pasture plants and increase the runoff rate. Applying a sufficient amount of lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIe.

ToC—Towerville silt loam, 8 to 15 percent slopes. This soil is sloping, moderately deep, and moderately well drained. It is on hilltops and side slopes in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsoil:
12 to 22 inches; dark yellowish brown, friable channery silt loam; 15 percent channery fragments
22 to 30 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
30 inches; bedded siltstone

Included in mapping are small areas of the somewhat poorly drained Orpark soils along drainageways and in slight depressions and small areas of Hornell soils, which have more clay in the subsoil than the Towerville soil. Also included are small areas of Chautauqua soils,

which have less clay in the subsoil than the Towerville soil and are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow or moderately slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil
Surface runoff: Rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 1.5 to 2.0 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for row crops grown in support of dairy farming.

This soil is well suited to most of the crops commonly grown in the county. Tillage is delayed by wetness in spring. Draining the wetter included soils allows for earlier planting and more uniform management of the fields. Installing subsurface drainage systems is difficult because of the underlying bedrock. Liberal applications of lime are needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Erosion is a hazard on long slopes in intensively cultivated areas. Minimizing tillage, farming on the contour, stripcropping, growing cover crops, and establishing diversions that break up long slopes help to control runoff and erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. The soil becomes compacted if it is grazed when wet. Overgrazing and surface compaction can restrict plant growth, damage pasture plants, and increase the runoff rate. Applying the proper kinds and amounts of lime and fertilizer, using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The seasonal wetness and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Where outlets are available, installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

Frost action and the seasonal wetness are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems help to overcome these limitations.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

The capability subclass is IIIe.

ToD—Towerville silt loam, 15 to 25 percent slopes. This soil is moderately steep, moderately well drained, and moderately deep over bedrock. It is on valley sides that commonly are dissected by V-shaped gullies. It is in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsoil:
12 to 22 inches; dark yellowish brown, friable channery silt loam; 15 percent channery fragments
22 to 30 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
30 inches; bedded siltstone

Included in mapping are small areas of the somewhat poorly drained Orpark soils along drainageways and in slight depressions and small areas of Hornell soils, which have more clay in the subsoil than the Towerville soil. Also included are small areas of Chautauqua soils, which have less clay in the subsoil than the Towerville soil and are very deep over bedrock, and small areas of soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow or moderately slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: Perched at a depth of 1.5 to 2.0 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most of the acreage is woodland or is idle land that is reverting to brush and shrubs. Some areas are used for hay or pasture. A few areas are used for row crops.

This soil is poorly suited to cultivated crops because of the slope and the severe hazard of erosion. The slope limits the use of farm equipment. Tillage is slightly delayed by wetness in spring. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Growing cover crops, minimizing tillage, and establishing diversions that break up long slopes and divert excess runoff help to control erosion. Where the slope permits, farming on the contour and stripcropping are suitable. Because tilling the soil is difficult and erosion is a hazard, long-term sod crops are more practical than most other crops. A large amount of lime and fertilizer is needed to maintain good crop growth.

This soil is better suited to hay and pasture than to cultivated crops. Overgrazing and grazing when the soil is wet restrict plant growth and can damage pasture plants. Erosion is a hazard in overgrazed areas. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs. Because the soil is naturally acid, applications of lime and fertilizer are needed to improve the growth of most pasture plants.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation is moderate because of the slope. The seedling mortality rate is low, and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails.

The slope, the seasonal wetness, and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Extensive land shaping may be necessary to overcome the slope. Although excavation is costly, the siltstone bedrock generally can be ripped with a backhoe. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The seasonal wetness, frost action, and low soil strength are the main limitations on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems increase soil strength and reduce the wetness and the potential for frost action. Land grading helps to overcome the slope.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

ToE—Towerville silt loam, 25 to 35 percent slopes. This soil is steep, moderately well drained, and moderately deep. It is on valley sides that commonly are dissected by V-shaped gullies. It is in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsoil:
12 to 22 inches; dark yellowish brown, friable channery silt loam; 15 percent channery fragments
22 to 30 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
30 inches; bedded siltstone

Included in mapping are small areas of the somewhat poorly drained Orpark soils along drainageways and in seepage spots and small areas of Hornell soils, which have more clay in the subsoil than the Towerville soil. Also included are small areas of the well drained Chadakoin soils, which have less clay in the subsoil than the Towerville soil and are very deep over bedrock; soils that are similar to the Towerville soil but

are well drained; and soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow or moderately slow in the lower part of the subsoil
Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: Perched at a depth of 1.5 to 2.0 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most areas are wooded and provide wildlife habitat. Some of the less sloping areas are idle or are used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm equipment is very difficult because of the slope. A plant cover that controls runoff and erosion is essential.

The less sloping areas of this soil can be used as pasture on a limited basis. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Reseeding pastures is difficult because of the slope. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for sugar maple is moderate. The use of equipment is restricted by the slope. The hazards of windthrow and erosion are slight, and the seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope, the seasonal wetness, and the restricted depth to bedrock are the main limitations on sites for dwellings with basements. Extensive land shaping may be necessary to overcome the slope. Although excavation may be costly, the siltstone bedrock generally can be ripped with a backhoe. Installing drains around footings and sealing foundations and basement walls help to prevent excessive wetness in basements.

The slope and frost action are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Adding coarse textured subgrade or base material reduces the potential for frost action.

The seasonal wetness, the restricted permeability, and the depth to bedrock are the main limitations on sites for septic tank absorption fields. The bedrock generally can be ripped with a backhoe. Care is needed to prevent the contamination of ground water resulting from seepage through the jointed and fractured bedrock. The absorption fields should be installed in suitable fill material. Installing a drainage system in the area around the absorption fields helps to overcome the seasonal wetness.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIe.

ToF—Towerville silt loam, 35 to 50 percent slopes. This soil is very steep, moderately well drained, and moderately deep. It is on valley sides that commonly are dissected by V-shaped gullies. It is in areas where the topography is influenced by the underlying bedrock. Siltstone bedrock is at a depth of 20 to 40 inches. The soil receives runoff from the higher adjacent soils. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 12 inches; very dark grayish brown silt loam

Subsoil:
12 to 22 inches; dark yellowish brown, friable channery silt loam; 15 percent channery fragments
22 to 30 inches; brown, mottled, firm channery silt loam; 20 percent channery fragments

Bedrock:
30 inches; bedded siltstone

Included in mapping are small areas of the somewhat poorly drained Orpark soils along drainageways and in seepage spots and small areas of Hornell soils, which have more clay in the subsoil than the Towerville soil. Also included are small areas of the well drained Chadakoin soils, which have less clay in the subsoil than the Towerville soil and are very deep over bedrock; soils that are similar to the Towerville soil but are well drained; and soils that have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and in the upper part of the subsoil and slow or moderately slow in the lower part of the subsoil

Available water capacity: Moderate
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: Perched at a depth of 1.5 to 2.0 feet from December through May
Flooding: None
Depth to bedrock: 20 to 40 inches

Most areas are wooded and provide wildlife habitat.

This soil is not suited to cultivated crops, hay, or pasture. The slope and the very severe hazard of erosion are the main management concerns. The soil is too steep for the safe operation of farm machinery. A plant cover that controls runoff and erosion is essential.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of erosion are severe. The seedling mortality rate is low, and the hazard of windthrow is slight. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

Construction is extremely difficult or impractical on this soil. The slope is the main limitation on sites for local roads and streets, dwellings with basements, and waste disposal systems. Erosion is a very serious hazard on construction sites. In most areas the native plant cover should not be removed.

The capability subclass is VIIe.

Ud—Udorthents, landfill. These nearly level to steep, loamy soils are in areas of sanitary landfills that have been reworked by earthmoving and grading equipment. Commonly, the trash and other refuse in these areas is partly covered or is mixed with the loamy soil material. In some areas the loamy material completely covers the refuse and is seeded. The sides of most areas are steep, and the top is nearly level or gently sloping. Most areas are rectangular and range from 10 to 100 acres in size. Slopes range from 0 to 35 percent. They are smooth and convex.

These soils vary too considerably to have a typical profile. Commonly, the upper 2 to 3 feet occurs as mixed layers of loamy material. This material is underlain by layers of trash and other refuse 5 to 20 feet thick. Where the loamy material is used for daily cover, it is likely to be less than 2 feet thick.

Included in mapping are areas that have been cut and filled. Generally, these areas are filled with soil material, rock, and debris from other sites and then are leveled. The soil material exhibits little or no evidence of profile development, and its texture and drainage class can vary considerably from one area to another.

Soil properties—

Permeability: Variable, but generally very rapid to moderate
Depth to the water table: Variable, depending upon the elevation and the level of the water in the adjacent soils
Available water capacity: Mainly low
Hazard of erosion: Moderate in the sloping areas and severe in the steep areas
Depth to bedrock: More than 6 feet

Most active sanitary landfills do not support plants. The older areas support varying amounts of grasses, weeds, and shrubs. Some reclaimed areas are used for hay, and some areas have been filled with soil material and rock debris and are used for urban development.

Settling of the underlying material and the instability of the material are the main limitations affecting homesite development, local roads and streets, and septic tank absorption fields. Areas that have an adequate cover of soil material and have been improved by land shaping can be used for hay. Most areas require onsite investigation to determine the suitability for various uses.

No capability subclass is assigned.

Ue—Udorthents, loamy-skeletal. These soils are nearly level, very deep, and well drained or somewhat poorly drained. Gravel and soil material formerly were removed from these soils, but the soils were later reclaimed by land leveling and are presently used for agricultural purposes. Most areas are rectangular and range from 10 to 50 acres in size. Slopes generally are smooth and range from 0 to 3 percent.

These soils exhibit little or no evidence of profile development. The texture and drainage class vary considerably from one area to another. In most areas the topsoil has been removed and stockpiled. After excavations for gravel were completed, the areas were leveled and covered with topsoil or loamy material.

In a typical profile the surface layer is brown or grayish brown gravelly loam or loamy sand 4 to 8 inches thick. The substratum is brown or yellowish brown very gravelly loamy sand to silty clay. In some areas, there is no topsoil and the substratum has numerous cobblestones.

Soil properties—

Permeability: Variable, but generally very rapid to moderate throughout the profile
Soil reaction: Very strongly acid to moderately acid throughout the profile

Depth to the water table: Variable, depending on the elevation and the level of the water in the adjacent soils
Available water capacity: Low
Hazard of erosion: Slight
Flooding: None
Depth to bedrock: More than 6 feet

Areas on lake plains are used for orchards, small fruit, or vineyards. Some areas are used for row crops or legumes grown in support of dairy farming. A small acreage is idle land.

Unless intensive management is applied, these soils are not suited to cultivated crops, hay, or pasture. Efforts should be made to increase the content of organic matter and build up the topsoil. Rock fragments can limit tillage and can cause machinery to wear at a more rapid rate. Liberal applications of lime and fertilizer are required for most crops. Measures that increase the content of organic matter and the available water capacity include growing cover crops and incorporating crop residue into the soils.

Because of the variability of these soils, onsite investigation is needed to determine the suitability for any urban use.

No capability subclass is assigned.

UnA—Unadilla silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and well drained. It is on broad flats in the larger valleys. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; dark grayish brown silt loam

Subsoil:
10 to 22 inches; dark yellowish brown, friable silt loam
22 to 42 inches; dark yellowish brown, friable silt loam; 2 percent gravel

Substratum:
42 to 50 inches; dark yellowish brown, friable silt loam; 5 percent gravel
50 to 72 inches; dark yellowish brown very gravelly sandy loam; 40 percent gravel

Included in mapping are small areas of the moderately well drained Scio soils along drainageways and in slight depressions; the moderately well drained Pompton soils, which have gravel throughout; and the well drained Allard soils, which are underlain by sand and gravel. Also included are a few areas of soils that have some stone fragments in the surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, alfalfa, vegetables, or small fruit. Scattered woodlots are in some areas, and some of the acreage is idle land. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county, including vegetables, legumes, and small fruit. This gravel-free soil can be easily tilled. It can be cultivated early in spring. Draining the wetter included soils allows for more efficient management of the fields. Row crops can be grown repeatedly if tilth and the content of organic matter are maintained by such measures as incorporating crop residue into the soil, plowing only when the soil is at the proper moisture content, growing cover crops, and rotating crops.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pasture plants, and grazing when the soil is wet causes surface compaction and seals the surface. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the potential for frost action.

This soil has few limitations as a site for septic tank absorption fields, but care is needed to prevent the

contamination of ground water resulting from the rapid permeability in the substratum.

This soil is a good source of topsoil. Some areas are excellent sites for athletic fields or other recreational uses that require a nearly level, stone-free site.

The capability class is I.

UnB—Unadilla silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on broad flats in the larger valleys. Individual areas are long and narrow and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; dark grayish brown silt loam

Subsoil:
10 to 22 inches; dark yellowish brown, friable silt loam
22 to 42 inches; dark yellowish brown, friable silt loam; 2 percent gravel

Substratum:
42 to 50 inches; dark yellowish brown, friable silt loam; 5 percent gravel
50 to 72 inches; dark yellowish brown very gravelly sandy loam; 40 percent gravel

Included in mapping are small areas of the moderately well drained Scio soils along drainageways and in slight depressions; the moderately well drained Pompton soils, which have gravel throughout; and the well drained Allard soils, which are underlain by sand and gravel. Also included are a few areas of soils that have some stone fragments in the surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, alfalfa, vegetables, or small fruit. Scattered woodlots are in some areas, and some of the acreage is idle land. This soil meets the requirements for prime farmland.

This soil is well suited to most of the crops commonly grown in the county, including vegetables, legumes, and small fruit. This gravel-free soil can be easily tilled. It can be cultivated early in spring. Draining the wetter included soils allows for more efficient management of the fields. If cultivated, the soil is very erodible, especially where slopes are long. Measures that minimize surface crusting and compaction and control runoff are needed. Farming on the contour, minimizing tillage, stripcropping, and maintaining a year-round plant cover help to control erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is well suited to pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pasture plants, and grazing when the soil is wet causes surface compaction and seals the surface. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for northern red oak is moderate. The equipment limitation and the hazards of erosion and windthrow are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the moisture content is ideal for seedling survival.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material and installing roadside drainage systems reduce the potential for frost action.

This soil has few limitations as a site for septic tank absorption fields, but care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

This soil is a good source of topsoil.

The capability subclass is IIe.

UnC—Unadilla silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained. It is on rolling plains, remnant ridges, and terraces in the larger valleys. Individual areas are oblong and range from 10 to 30 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 10 inches; dark grayish brown silt loam

Subsoil:
10 to 22 inches; dark yellowish brown, friable silt loam
22 to 42 inches; dark yellowish brown, friable silt loam; 2 percent gravel

Substratum:
42 to 50 inches; dark yellowish brown, friable silt loam; 5 percent gravel
50 to 72 inches; dark yellowish brown very gravelly sandy loam; 40 percent gravel

Included in mapping are small areas of the moderately well drained Scio soils along drainageways and in slight depressions; the moderately well drained Pompton soils, which have gravel throughout; and the well drained Allard soils, which are underlain by sand and gravel. Also included are a few areas of soils that have some stone fragments in the surface layer. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderately rapid or rapid in the substratum
Available water capacity: High
Soil reaction: Very strongly acid to moderately acid in the surface layer and subsoil and strongly acid to mildly alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Many areas are used for hay, pasture, or woodland. Some of the acreage is used for cultivated crops grown in support of dairy farming or is idle land.

This soil is moderately well suited to most of the crops commonly grown in the county. It is suited to deep-rooted perennial crops, such as alfalfa. Erosion is a hazard where cultivated crops are grown. Draining the wetter included soils allows for more efficient management of the fields. This soil commonly has no stones and can be easily tilled. Interceptor drains can divert seepage and runoff from the higher adjacent soils and thus reduce the hazard of erosion. Minimizing tillage, farming on the contour, stripcropping, and maintaining a year-round plant cover also help to control erosion. Growing cover crops, incorporating crop residue into the soil, and tilling only when the soil is at the proper moisture content help to maintain tilth and increase the content of organic matter.

This soil is better suited to hay and pasture than to row crops. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Overgrazing damages pasture plants, and grazing when the soil is wet causes surface compaction and seals the surface. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and applying the proper kinds and amounts of lime and fertilizer are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of windthrow are slight, and the seedling mortality rate is low. Seedlings should be planted in spring, when the moisture content is ideal for seedling survival. The hazard of erosion is moderate. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation.

Frost action and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems and backfilling with coarse textured subgrade or base material reduce the potential for frost action.

The slope is the main limitation on sites for septic tank absorption fields. Land grading and shaping help to overcome this limitation. Care is needed to prevent the contamination of ground water resulting from the rapid permeability in the substratum.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

This soil is a good source of topsoil.

The capability subclass is IIIe.

Ur—Urban land. This unit consists of nearly level to sloping areas in which 85 percent or more of the surface is covered with asphalt, concrete, or other impervious material. It includes parking lots, shopping and business centers, and industrial parks in the cities of Dunkirk and Jamestown and the villages of Fredonia and Lakewood. Individual areas generally range from 20 to more than 200 acres in size.

Included in mapping are small areas of soils that have not been altered or are not under an impervious cover. These areas are mostly lawns or other landscaped areas. Also included are some areas where several feet of fill has been placed on flood plains. The included soils consist of the well drained Chenango and Valois soils and the somewhat poorly drained Niagara and Minoa soils. Included areas make up about 15 percent of this unit.

It is not practical to examine and identify the soils underlying Urban land. Careful onsite investigation is needed to determine the suitability of abandoned areas for any proposed use. Some abandoned areas are suitable for asphalt-covered playgrounds or for other recreational uses requiring a hard, impervious surface.

The capability subclass is VIIIs.

VaB—Valois gravelly silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and well drained. It is on reglaciated moraines on the lower sides of the major valleys. Individual areas are oblong or irregularly shaped. They commonly range from 10 to 75 acres in size, but some are as large as 200 acres or more.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
- 0 to 6 inches; dark brown gravelly silt loam

Subsoil:
- 6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel
- 11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel
- 28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:
- 45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel
- 48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along drainageways. Also included are the moderately well drained Chautauqua and Mardin soils in areas where the Valois soil adjoins glacial till, Chenango soils in areas where the Valois soil adjoins gravelly outwash, nearly level Valois soils, and soils that have a channery surface layer. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for field crops, alfalfa, hay, or pasture. The field crops are grown in support of dairy farming. Woodlots are in some areas, and some of the acreage is idle land that is reverting to shrubs and brush. This soil meets the requirements for prime farmland.

This soil is well suited to all of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted legumes grow especially well. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Gravel and occasional channery fragments in the surface layer interfere with the cultivation of some crops and can increase the wear on machinery. Erosion is a hazard in intensively cultivated areas. Farming on the contour and stripcropping help to control erosion and conserve water during the growing season. Incorporating crop residue into the soil, minimizing tillage, growing cover crops, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, and control erosion. In some years droughtiness restricts crop growth.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

This soil has few limitations as a site for dwellings with basements. Frost action is the main limitation on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action.

This soil is moderately limited as a site for septic tank absorption fields because of the moderate permeability in the subsoil. Care is needed to prevent the contamination of ground water resulting from seepage.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIe.

VaC—Valois gravelly silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and well drained. It is on reglaciated moraines on the lower sides of valleys. Individual areas are oblong and range from 10 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark brown gravelly silt loam

Subsoil:

6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel

11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel

28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:

45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel

48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along drainageways. Also included are the moderately well drained Chautauqua and Mardin soils in areas where the Valois soil adjoins glacial till, Chenango soils in areas where the Valois soil adjoins gravelly outwash, nearly level Valois soils, and soils that have a channery surface layer. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for field crops, alfalfa, hay, or pasture. The field crops are grown in support of dairy farming. Woodlots are in some areas, and some of the acreage is idle land that is reverting to shrubs and brush.

This soil is moderately well suited to all of the crops commonly grown in the county. The crops that are planted early in spring and deep-rooted legumes grow especially well. Lime is needed for most crops, especially legumes. Crops respond well to liberal applications of fertilizer. Gravel and occasional channery fragments in the surface layer interfere with the cultivation of some crops and can increase the wear on machinery. Erosion is a hazard in intensively cultivated areas. Contour farming and stripcropping in combination with diversions or grassed waterways help to control erosion. Incorporating crop residue into the soil, minimizing tillage, growing cover crops, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, minimize erosion, and conserve moisture. Installing drainage tile in the wet included areas helps to make management of the fields more efficient.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation.

Frost action and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems and backfilling with coarse textured subgrade or base material reduce the potential for frost action.

The slope and the moderate permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Land grading and shaping help to overcome the slope. Care is needed to prevent the contamination of ground water resulting from seepage.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

VaD—Valois gravelly silt loam, 15 to 25 percent slopes. This soil is moderately steep, very deep, and well drained. It is on hilly reglaciated moraines on the lower sides of valleys. Individual areas are oblong and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark brown gravelly silt loam

Subsoil:

6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel

11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel

28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:

45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel

48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of the moderately well drained Pompton soils in slight depressions and along drainageways. Also included are the well drained Chadakoin and Mardin soils in areas where the Valois soil adjoins glacial till, Chenango soils in areas where the Valois soil adjoins gravelly outwash, nearly level Valois soils, and soils that have a channery surface layer. Included areas make up about 15 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Hazard of erosion: Severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to shrubs and brush. Some areas are used for hay or pasture. A few areas are used for row crops.

This soil is poorly suited to cultivated crops because of the slope and the severe hazard of erosion. The slope limits the use of farm equipment. Channery fragments on the surface interfere with tillage and cause excessive wear on machinery. Cultivated crops should be grown only occasionally, and the maximum number of conservation practices should be used. Growing cover crops, minimizing tillage, and establishing diversions that break up long slopes and divert excess runoff help to control erosion. Where the slope permits, farming on the contour and stripcropping are suitable. Because tilling the soil is difficult and erosion is a hazard, long-term sod crops are more practical than other crops. A large amount of lime and fertilizer is needed to maintain good crop growth.

This soil is better suited to hay and pasture than to cultivated crops. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The hazards of windthrow and erosion are slight. Building skid trails across the slope minimizes gullying along the trails. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist. The equipment limitation is moderate because of the slope.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation.

Frost action and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems and backfilling with coarse textured subgrade or base material reduce the potential for frost action.

The slope and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Land grading and shaping help to overcome the slope. Care is needed to prevent the contamination of ground water resulting from seepage.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IVe.

VaE—Valois gravelly silt loam, 25 to 35 percent slopes. This soil is steep, very deep, and well drained. It is on reglaciated moraines on the sides of valleys. Many areas are deeply dissected by V-shaped gullies. Individual areas are elongated or occur as narrow strips on the valley sides. The areas range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark brown gravelly silt loam

Subsoil:

6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel

11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel
28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:

45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel
48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of the moderately well drained Pompton and Chautauqua soils along drainageways and in seepage spots. Also included are Chadakoin and Schuyler soils in areas where the Valois soil adjoins glacial till, Chenango soils in areas where the Valois soil adjoins gravelly outwash, and narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded and provide wildlife habitat. Some of the less sloping areas are idle or are used as pasture.

This soil is not suited to cultivated crops or hay because of the slope and the very severe hazard of erosion. Operating farm equipment is very difficult because of the slope. A plant cover that controls runoff and erosion is essential.

The less sloping areas of this soil can be used as pasture on a limited basis. A good plant cover is needed. Prevention of overgrazing helps to protect the soil from erosion and gullying. Reseeding pastures is difficult because of the slope. Liberal applications of lime and fertilizer are needed to improve native pastures.

The potential productivity of this soil for sugar maple is moderate. The use of equipment is restricted by the slope. The hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings grow better if they are planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation. Designing the dwellings so that they conform to the natural slope of the land reduces the amount of grading required.

The slope is the main limitation on sites for local roads and streets. Land grading and building on the contour help to overcome this limitation.

The slope and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Land grading and shaping help to overcome the slope. Care is needed to prevent the contamination of ground water resulting from seepage.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is VIe.

VaF—Valois gravelly silt loam, 35 to 50 percent slopes. This soil is very steep, very deep, and well drained. It is on reglaciated moraines on the sides of valleys. Many areas are deeply dissected by V-shaped gullies. Individual areas are elongated or occur as narrow strips on the valley sides. The areas range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:

0 to 6 inches; dark brown gravelly silt loam

Subsoil:

6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel
11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel
28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:

45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel
48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of the moderately well drained Pompton and Chautauqua soils along drainageways and in seepage spots. Also included are Chadakoin and Schuyler soils in areas where the Valois soil adjoins glacial till, Chenango soils in areas where the Valois soil adjoins gravelly outwash, and narrow bands of Fluvaquents and Udifluvents on the flood plains along the streams that dissect the unit. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Rapid
Hazard of erosion: Very severe
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are wooded and provide wildlife habitat.

This soil is not suited to cultivated crops, hay, or pasture. It is limited mainly by the slope and the very severe hazard of erosion. It is too steep for the safe operation of farm equipment. A plant cover that controls runoff and erosion is essential.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazard of erosion are severe. The seedling mortality rate is low, and the hazard of windthrow is slight. Building logging roads and skid trails across the slope helps to control erosion and minimizes gullying along the trails.

Construction is extremely difficult or impractical on this soil. The slope is the main limitation on sites for local roads and streets, dwellings with basements, and waste disposal systems. Erosion is a very serious hazard on construction sites. In most areas the native plant cover should not be removed.

The capability subclass is VIIe.

VcC—Valois gravelly silt loam, rolling. This soil is rolling, very deep, and well drained. It is on a series of ridges and knolls that slope in many directions. It is on dissected terraces, on long eskers, and in areas of kettle-kame deposits. Individual areas are oblong or irregularly shaped and range from 10 to 75 acres in size. Slopes range from 3 to 15 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; dark brown gravelly silt loam

Subsoil:
6 to 11 inches; yellowish brown, friable gravelly silt loam; 15 percent gravel
11 to 28 inches; yellowish brown, friable gravelly loam; 20 percent gravel
28 to 45 inches; dark yellowish brown, friable gravelly sandy loam; 30 percent gravel

Substratum:
45 to 48 inches; brown very gravelly loamy sand; 35 percent gravel
48 to 72 inches; brown very gravelly sandy loam; 45 percent gravel

Included in mapping are small areas of severely eroded soils on the steeper parts of knolls and small areas of poorly drained soils that have a surface layer that is thicker than that of the Valois soil and are in pockets between the knolls. Also included are the moderately well drained Chautauqua and somewhat poorly drained Busti soils in small areas where the Valois soil adjoins glacial till. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsoil and moderate or moderately rapid in the substratum
Available water capacity: Moderate
Soil reaction: Extremely acid to moderately acid in the surface layer and subsoil and very strongly acid to neutral in the substratum
Surface runoff: Medium
Hazard of erosion: Moderate
Water table: At a depth of more than 6 feet
Flooding: None
Depth to bedrock: More than 6 feet

Most areas have been cleared and are used for field crops, alfalfa, hay, or pasture. The field crops are grown in support of dairy farming. Woodlots are in some areas, and some of the acreage is idle land that is reverting to shrubs and brush.

This soil is moderately well suited to all of the crops commonly grown in the county, but the complex topography makes intensive cropping impractical. The soil is better suited to long-term hay crops. Erosion is a hazard in intensively cultivated areas. Because of the complex and rolling topography, farming on the contour, establishing diversions, and stripcropping are difficult. Lime is needed for most crops, especially deep-rooted legumes. Crops respond well to liberal applications of fertilizer. Incorporating crop residue into the soil, minimizing tillage, growing cover crops, and including sod crops in the cropping system help to maintain tilth, increase the content of organic matter, help to control erosion, and conserve moisture. Installing drainage tile in the wet included areas helps to make management of the fields more efficient.

This soil is well suited to hay and pasture. It is especially suitable for grazing early in the growing season. Overgrazing can restrict plant growth and increase the hazard of erosion. Deep-rooted legumes

grow well, but applications of lime and fertilizer are required to maintain the quality of the stands and to ensure good plant growth. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are the main management needs.

The potential productivity of this soil for sugar maple is moderate. The equipment limitation and the hazards of windthrow and erosion are slight. The seedling mortality rate is low. Seedlings should be planted early in spring, when the soil is moist. Building skid trails across the slope minimizes gullying along the trails.

The slope is the main limitation on sites for dwellings with basements. Land grading and shaping help to overcome this limitation.

Frost action and the slope are the main limitations on sites for local roads and streets. Land grading and building on the contour help to overcome the slope. Installing roadside drainage systems and backfilling with coarse textured subgrade or base material reduce the potential for frost action.

The slope and the moderate permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Land grading and shaping help to overcome the slope. Care is needed to prevent the contamination of ground water resulting from seepage.

Erosion is a hazard on construction sites. It can be controlled by revegetating disturbed areas as soon as possible.

The capability subclass is IIIe.

VoA—Volusia channery silt loam, 0 to 3 percent slopes. This soil is nearly level, very deep, and somewhat poorly drained. It is on flat hilltops that receive little or no runoff and on upland benches that receive runoff from the higher adjacent soils. Individual areas are circular or irregularly shaped and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown channery silt loam

Subsurface layer:
9 to 15 inches; grayish brown, distinctly mottled, friable silt loam

Subsoil:
15 to 42 inches; a fragipan of brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:
42 to 72 inches; olive brown, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Busti soils, which do not have a firm fragipan; and Fremont soils, which do not have a firm fragipan and have more clay in the subsoil than the Volusia soil. Also included are small areas of Orpark soils, which are 40 inches deep over bedrock, and small areas of Volusia soils that do not have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow or very slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan, strongly acid to slightly acid in the fragipan, and strongly acid to mildly alkaline in the substratum
Surface runoff: Slow
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. These areas generally are farmed at a low level of intensity.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is more difficult on this soil than on the more sloping adjacent Erie soils. If a drainage system is installed, the soil is suited to the crops commonly grown in the county. The wetness can be reduced by closely spaced tile and open-ditch drainage systems. Maintaining good tilth is a management concern in intensively cultivated areas. Minimizing tillage, incorporating crop residue into the soil, growing cover crops, and tilling only when the soil is at the proper moisture content help to maintain tilth and the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet,

controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

VoB—Volusia channery silt loam, 3 to 8 percent slopes. This soil is gently sloping, very deep, and somewhat poorly drained. It is on hilltops, side slopes, and concave toe slopes on uplands that receive runoff from the higher adjacent soils. Individual areas are oblong or irregularly shaped and range from 5 to 75 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown channery silt loam

Subsurface layer:
9 to 15 inches; grayish brown, distinctly mottled, friable silt loam

Subsoil:
15 to 42 inches; a fragipan of brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:
42 to 72 inches; olive brown, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in slight depressions and along drainageways; Busti soils, which do not have a firm fragipan; and Fremont soils, which do not have a fragipan and have more clay in the subsoil than the Volusia soil. Also included are small areas of Orpark soils, which have bedrock within a depth of 40 inches, and small areas of Volusia soils that do not have a channery surface layer. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow or very slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan, strongly acid to slightly acid in the fragipan, and strongly acid to mildly alkaline in the substratum
Surface runoff: Medium
Hazard of erosion: Slight
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most of the acreage is woodland or is idle land that is reverting to woodland. Some areas are used for small grain, corn, or hay grown in support of dairy farming. These areas generally are farmed at a low level of intensity.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture. Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the

stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIw.

VoC—Volusia channery silt loam, 8 to 15 percent slopes. This soil is sloping, very deep, and somewhat poorly drained. It is on hillsides, valley sides, and the side slopes of dissecting drainageways. It receives runoff from the higher adjacent soils. Individual areas are oblong or rectangular and range from 10 to 50 acres in size.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 9 inches; very dark grayish brown channery silt loam

Subsurface layer:
9 to 15 inches; grayish brown, distinctly mottled, friable silt loam

Subsoil:
15 to 42 inches; a fragipan of brown, mottled, firm gravelly silt loam; 20 percent gravel

Substratum:
42 to 72 inches; olive brown, firm gravelly silt loam; 25 percent gravel

Included in mapping are small areas of the poorly drained Ashville soils in seepage spots and along drainageways; Busti soils, which do not have a firm fragipan; and Fremont soils, which have more clay in the subsoil than the Volusia soil. Also included are small areas of the moderately well drained Mardin soils in the higher positions on the landscape and small areas of Orpark soils, which have bedrock within a depth of 40 inches. Included areas make up about 25 percent of this unit.

Soil properties—

Permeability: Moderate in the surface layer and subsurface layer and slow or very slow in the fragipan and substratum
Available water capacity: Moderate
Soil reaction: Very strongly acid to slightly acid above the fragipan, strongly acid to slightly acid in the fragipan, and strongly acid to mildly alkaline in the substratum
Surface runoff: Rapid
Hazard of erosion: Moderate
Water table: Perched at a depth of 0.5 foot to 1.5 feet from December through May
Flooding: None
Depth to bedrock: More than 6 feet

Most areas are used for cultivated crops, hay, or pasture. Some of the acreage is woodland or is idle land that is reverting to woodland.

This soil is moderately well suited to cultivated crops. Unless a drainage system is installed, planting is delayed in spring and the soil can be used only for short-season annual crops, hay, or pasture. Harvesting crops during prolonged wet periods in fall is difficult. If drained and protected from erosion, the soil is suited to the crops commonly grown in the county. Interceptor drains can divert runoff from the higher adjacent soils, and tile and open-ditch drainage systems can remove excess water. Tile drains generally should be closely spaced because of the restricted permeability in the subsoil. Erosion can be controlled by stripcropping, farming on the contour, growing cover crops, and minimizing tillage. Incorporating crop residue into the soil and tilling only when the soil is at the proper moisture content improve tilth and help to maintain the content of organic matter.

This soil is suited to water-tolerant hay and to late-spring pasture. Overgrazing and grazing when the soil is wet are the main concerns in managing pasture.

Grazing when the soil is wet causes surface compaction, restricts plant growth, and can deplete the stand of pasture grasses and thus result in serious erosion. Using proper stocking rates, rotating livestock grazing, deferring grazing when the soil is wet, controlling weeds and brush, and selecting water-tolerant species for seeding are the main management needs.

The potential productivity of this soil for northern red oak is moderately high. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The seasonal wetness is the main limitation on sites for dwellings with basements. Where outlets are available, installing drains around footings reduces the wetness. Also, sealing foundations and basement walls helps to prevent excessive wetness in basements.

The seasonal wetness and frost action are the main limitations on sites for local roads and streets. Installing roadside drainage systems and building on raised fill material help to overcome these limitations.

The seasonal wetness and the restricted permeability in the subsoil are the main limitations on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Installing a drainage system in the area around the absorption fields reduces the wetness, and adding permeable fill material helps to overcome the wetness and the restricted permeability.

Erosion is a serious hazard if the plant cover is removed during construction.

The capability subclass is IIIe.

Wa—Wakeville silt loam. This soil is nearly level, very deep, and somewhat poorly drained. It is in low areas on flood plains along the major streams in the county. Individual areas generally are oblong and are parallel to the adjacent streams. They range from 5 to 50 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 7 inches; dark grayish brown silt loam

Subsoil:
7 to 12 inches; brown, friable silt loam
12 to 26 inches; dark grayish brown, distinctly mottled silt loam
26 to 42 inches; grayish brown, distinctly mottled, friable silt loam

Substratum:
42 to 72 inches; grayish brown and dark yellowish brown silt loam

Included in mapping are small areas of the poorly drained Wayland soils in slight depressions and along the older meander scars and oxbows and small areas of the moderately well drained Teel soils in the slightly higher positions on the landscape and on benches. Also included are the very poorly drained Alden soils in small areas where alluvial soils adjoin deposits of glacial till. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderate throughout the profile
Available water capacity: High
Soil reaction: Moderately acid to neutral to a depth of 40 inches and moderately acid to mildly alkaline below that depth
Surface runoff: Slow
Hazard of erosion: Slight
Water table: At a depth of 0.5 foot to 1.5 feet from January through May
Flooding: Occasional
Depth to bedrock: More than 6 feet

Most areas are used for row crops grown in support of dairy farming. Some areas that cannot be easily farmed are idle or are used as woodland. These areas generally are small and isolated. Where drained, this soil meets the requirements for prime farmland.

This soil is moderately well suited to cultivated crops. Flooding is a hazard. It can delay planting or damage crops in some years. The seasonal high water table can delay tillage and planting and can make harvesting difficult, especially in low areas. The wetness can be reduced by installing subsurface drains in areas where outlets are available. If a drainage system is installed, the soil is well suited to most of the crops commonly grown in the county. The soil has a stone-free surface layer and can be easily tilled. Minimizing tillage, incorporating crop residue into the soil, and growing cover crops and occasional sod crops help to maintain tilth and the content of organic matter. Measures that protect streambanks are needed in some areas to prevent lateral erosion in the fields.

Hay and pasture plants grow well on this soil. Overgrazing and grazing when the soil is wet can cause surface compaction, deplete the stand of pasture plants, and restrict plant growth. Using proper stocking rates, rotating livestock grazing, controlling weeds and brush, and deferring grazing early in spring are the main management needs.

The potential productivity of this soil for red maple is

moderate. The seasonal wetness limits the use of logging equipment and increases the seedling mortality rate. Trees are susceptible to windthrow because the rooting depth is restricted by the seasonal wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for dwellings with basements. Fill material is needed to elevate the dwellings above the high water level during periods of flooding. Adding fill material, installing drains around footings, and sealing foundations and basement walls help to prevent excessive wetness in basements.

The hazard of flooding, the seasonal wetness, and frost action are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material reduces the potential for frost action. Building on raised fill material reduces the hazard of flooding and helps to overcome the wetness.

The hazard of flooding and the seasonal wetness are the main management concerns on sites for septic tank absorption fields. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed. Building on raised fill material helps to overcome the wetness and reduces the hazard of flooding.

The capability subclass is IIIw.

Wy—Wayland silt loam. This soil is nearly level, very deep, and poorly drained or very poorly drained. It is in the lowest positions on the flood plains along the major streams in the county. Individual areas generally are oblong and are parallel to the adjacent streams. The areas range from 10 to 75 acres in size. Slopes commonly are smooth and range from 0 to 3 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows—

Surface layer:
0 to 6 inches; very dark grayish brown silt loam

Subsoil:
6 to 12 inches; dark grayish brown, mottled, friable silt loam
12 to 18 inches; grayish brown, distinctly mottled, friable silt loam

Substratum:
18 to 46 inches; gray, friable silt loam
46 to 72 inches; gray, firm silty clay loam

Included in mapping are small areas of Wakeville and Holderton soils in the higher positions on the flood plains, soils that have a mucky surface layer, and soils that have sand and gravel within a depth of 36 inches. Included areas make up about 20 percent of this unit.

Soil properties—

Permeability: Moderately slow or moderate in the surface layer and slow in the subsoil and substratum
Available water capacity: High
Soil reaction: Moderately acid to mildly alkaline to a depth of 24 inches and moderately acid to moderately alkaline below that depth
Surface runoff: Occasionally ponded to slow
Hazard of erosion: Slight
Water table: 0.5 foot above the surface to 1.0 foot below from November through June
Flooding: Frequent
Depth to bedrock: More than 6 feet

Most of the acreage is idle land that supports water-tolerant grasses, brush, and trees. Some areas are used as pasture. Some drained areas are cultivated. This soil meets the requirements for hydric soils.

This soil is not suited to cultivated crops because of prolonged wetness and the frequent flooding. Draining the soil commonly is difficult because few suitable outlets are available. Where it can be drained, this gravel-free soil is suited to many crops. Tilth and soil structure deteriorate if the soil is plowed when wet. Growing cover crops, incorporating crop residue into the soil, plowing only when the soil is at the proper moisture content, and rotating crops help to maintain a high content of organic matter and good tilth. Sod crops and cover crops protect the surface from scouring by floodwater.

Undrained areas of this soil can be used as pasture on a limited basis. The pasture grasses that can withstand wetness grow best. Restricting grazing when the soil is wet helps to prevent surface compaction and damage to the pasture. The pasture should be plowed, a seedbed prepared, and seed planted during dry periods in summer. Using proper stocking rates, rotating livestock grazing, and controlling weeds and brush are other management needs.

The potential productivity of this soil for red maple is moderate. The hazard of erosion is slight. Prolonged wetness results in a high seedling mortality rate and restricts the growth of roots. The hazard of windthrow is severe. The equipment limitation is severe because of the prolonged wetness. The trees that can withstand wetness grow best.

Prolonged wetness and the hazard of flooding are the main management concerns on sites for dwellings with basements. This soil is too wet for the construction of dwellings with basements. Included areas of the somewhat poorly drained Wakeville soils are better sites for these dwellings. Building on raised fill material helps to overcome the wetness.

Prolonged wetness, the hazard of flooding, and low soil strength are the main management concerns on sites for local roads and streets. Adding coarse textured subgrade or base material and building on raised fill material reduce the hazard of flooding, help to overcome the wetness, and increase soil strength.

The hazard of flooding, the wetness, and the restricted permeability are the main management concerns on sites for septic tank absorption fields. Adding suitable permeable fill material helps to overcome these limitations. Extensive engineering and design modifications are needed if onsite waste disposal systems are installed.

The capability subclass is Vw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 140,000 acres in the survey area, or nearly 20 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in the major valleys and on the beach ridge in the parts of the lake plain region that are in general soil map units 9 and 10.

About 270,000 acres, or 40 percent of the total acreage, is made up of soils that have a seasonal high water table. These soils may qualify as prime farmland if this limitation is overcome by drainage measures. They are in scattered areas throughout the county on the uplands and in the lower positions on lake plains, mainly in general soil map units 1, 2, 3, and 6. The crops grown on this land are mainly corn, small grain, and hay in the plateau region and vegetables, small fruit, vineyards, and orchards in the lake plain region.

A recent trend in land use in some parts of the county has been the loss of prime farmland to industrial and urban uses. The conversion of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units."

In table 5, the need for measures that overcome the seasonal high water table is indicated in parentheses after the name of the map unit. Onsite evaluation is necessary to see if this limitation has been overcome.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Principles of Management

In 1982, more than 200,000 acres in Chautauqua County was used for crops and pasture *(15)*. Of this total, 57,000 acres was used for pasture and 143,000 acres for field crops, mostly hay, corn, small grain, and vegetables.

The potential for increased crop production is excellent in some parts of the county. About 30,000 acres of potentially good cropland currently is used for pasture, and another 77,000 acres is used as woodland *(13)*. In addition to the reserve productive capacity represented by these lands, crop yields can be increased by applying the latest crop technology and appropriate soil conservation practices to all of the cropland in the county. This soil survey can facilitate the use of new technology and the application of conservation practices.

The acreage in crops and pasture has decreased rapidly in the last few decades as more and more land has been converted to urban and recreational uses. The use of this soil survey to make land use decisions that affect farming in the county is discussed in the sections "Use and Management of the Soils" and "Detailed Soil Map Units."

Some general principles of soil management for crop production in Chautauqua County are described in the following paragraphs.

Soil erosion is a major hazard on about one-third of the cropland in Chautauqua County, according to the 1974 New York State Erosion and Sediment Inventory *(11)*. Additionally, soils along the shores of Lake Erie are subject to shoreline erosion (fig. 14). This erosion

Figure 14.—Shoreline erosion on the bluffs along Lake Erie in an area of the Niagara-Canandaigua-Minoa general soil map unit.

presents a threat to existing housing and recreational areas in the survey area. The hazard of erosion is related to the slope, the erodibility of the soils, the amount and intensity of rainfall, and the type of plant cover.

Loss of soil through erosion results in loss of nutrients and water, formation of gullies on hillsides, deterioration of tilth, detrimental sedimentation downslope, and pollution of streams and reservoirs. Soil productivity is reduced when the surface layer is lost and increasing amounts of the subsoil are incorporated into the plow layer. Loss of productivity is greater if the erosion occurs on soils that have a fine textured or moderately fine textured subsoil, such as Collamer and Churchville soils, or on soils that have a compact subsoil that restricts rooting depth, such as Mardin and Volusia soils. Erosion also reduces productivity on soils that tend to be droughty, such as Chenango and Colonie soils, through the loss of organic matter. Soils that are moderately deep over bedrock, such as Towerville and Hornell soils, are permanently damaged by erosion.

Erosion control provides protective cover, reduces runoff, and increases water infiltration. Many tillage and conservation practices help to control erosion. Minimum tillage, no-till, cover crops, crop residue management, and a cropping system that includes a high proportion of sod-forming crops are effective in controlling erosion

on soils that have short, irregular slopes, such as Valois and Chenango soils. Contour tillage, stripcropping, terraces, and diversions are more suitable on soils that have smooth, long, uniform slopes, such as the sloping Busti and Chautauqua soils.

Most soils that have slopes of more than 3 percent require some measures to control water erosion. Soils that have a high content of silt and do not contain coarse fragments, such as Allard, Unadilla, and Collamer soils, are highly susceptible to erosion.

Wind erosion is a hazard on some soils, such as the sandy Colonie soils and cleared and drained areas of the organic Carlisle and Henrietta soils. Wind erosion is greater if the surface is dry. Planting windbreaks, regulating the level of the water table, and irrigating help to control wind erosion.

The effectiveness of particular combinations of conservation practices varies with the soil. Moreover, different combinations can be equally effective on the same soils. Additional information on erosion-control practices is available at the local office of the Chautauqua County Soil and Water Conservation District or the Soil Conservation Service.

Drainage is a major need on about one-half of the potential cropland in the survey area. On some wet soils, the production of crops commonly grown in the area is generally not feasible unless an extensive drainage system is installed. Examples of these soils are the poorly drained and very poorly drained Alden, Canandaigua, Getzville, Halsey, Henrietta, Lamson, and Wayland soils.

Seasonal wetness limits early planting, growth, and harvesting of most crops on somewhat poorly drained soils, such as Busti, Erie, Niagara, Raynham, and Red Hook soils. Crops on these soils respond well to improved drainage. Yields commonly are as high on artificially drained soils as on naturally well drained soils.

Some well drained and moderately well drained soils, such as Valois, Unadilla, Chautauqua, Langford, and Scio soils, have small areas of wetter soils. Installing random subsurface drains in these small areas allows more uniform management of fields.

Interceptor drains divert surface runoff and subsurface seepage. They are effective on some wet, sloping soils, such as Busti and Erie soils.

The design of a drainage system varies with the kind of soil. A combination of surface and subsurface drainage is needed in areas of poorly drained and very poorly drained soils. Surface drainage can include open ditches, grassed waterways, land smoothing, and bedding. Subsurface drainage is mainly tile or plastic pipe. However, establishing drainage outlets is difficult and expensive on soils in low positions on the landscape.

Drains must be more closely spaced in slowly permeable soils than in more permeable soils. Subsurface drainage is slow in such soils as Rhinebeck, Canandaigua, and Darien soils. These soils may also require surface drainage. Subsurface drainage is very effective in rapidly permeable soils, such as Red Hook, Halsey, and Lamson soils, if adequate outlets are available.

Information on installation and cost of drainage systems is available at the office of the Chautauqua County Soil and Water Conservation District and at the local office of the Soil Conservation Service.

Available water capacity is important in growing crops. Some of the soils in the county have a relatively low capacity to store moisture and tend to be droughty. These include sandy and gravelly soils and soils that have a fragipan. The gravelly Chenango soils, the sandy Colonie soils, and the Volusia soils that have a fragipan are examples. Growing green manure crops, returning crop residue to the soil, and adding manure increase the organic matter content, improve structure, and increase the available water capacity of these droughty soils.

Soil tilth is an important factor in the germination of seedlings, the infiltration of water, and the ease of cultivation. Soils that have good tilth generally are granular structure and porous and are easy to cultivate.

Tillage has a strong influence on soil tilth. Excessive tillage tends to reduce organic matter content and break down soil structure. Chenango and Colonie soils, which are very deep, well drained or excessively drained, and coarse textured or moderately coarse textured, can be tilled without damaging tilth. The wetter and finer textured Rhinebeck and Canandaigua soils, however, must be tilled at the proper moisture content to prevent deterioration of the natural structure. Plowing or cultivating these soils when they are wet causes puddling and results in the formation of a hard surface crust and clods as the soils dry. Cultivating the soils at the proper moisture content, including cover crops, green manure crops, and sod crops in the cropping system, returning crop residue to the soil, and adding manure help to keep the soils granular and porous.

Soil fertility is important for optimum crop production. It can be maintained by the addition of lime, fertilizer, or both. The amount needed depends on the natural content of lime and plant nutrients, on the needs of the crop, and on the level of desired yields.

Organic matter content is important in assessing fertility. It averages about 5 percent in the surface layer of the soils in Chautauqua County. Poorly drained and

very poorly drained soils, such as Canadice and Alden soils, are somewhat higher in organic matter content.

Nitrogen is released from the organic matter in the soil, but much of the nitrogen is in complex forms that cannot be used by plants until it has been decomposed by micro-organisms. Nitrogen fertilizer is needed to supplement the nitrogen supplied by the decomposition of the organic matter in the soil. Management practices that increase the content of organic matter, including growing green manure crops and sod crops and returning crop residue to the soil, improve the natural content of nitrogen.

Timeliness of nitrogen fertilization is important to ensure its maximum use by plants. Nitrogen can be lost through leaching in rapidly permeable soils, such as Chenango soils, or by denitrification in the wetter and less permeable soils, such as Fremont soils. The best results can be obtained by applying small amounts of nitrogen at the proper intervals. For example, the nitrogen can be applied at the time of planting and again later as a sidedressing when the crop is growing.

The soils in Chautauqua County generally have low levels of natural phosphorus. Coarse textured soils, such as Colonie and Chenango soils, tend to be very low in phosphorus. Adding appropriate amounts of phosphorus in the form of commercial fertilizer is essential for good plant growth.

Most of the soils in the county have low or medium levels of available potassium. Soils that have a clayey subsoil, however, such as Rhinebeck and Canadice soils, are somewhat higher in potassium. Even on soils that have a fairly high content of potassium, adding potassium increases yields of most crops.

Lime is needed for most of the soils in the survey area to raise the reaction to a level that will ensure optimum yields of most crops. Additions of lime and fertilizer should be based on the results of soil tests. For assistance in obtaining soil tests and recommendations, farmers and others can contact the local office of the Cooperative Extension Service. Information on recent research findings and fertilizer recommendations can be found in the current edition of "Cornell Recommends For Field Crops" and "Vegetable Production Recommendations." These bulletins were prepared by the staff of the New York State College of Agriculture, Cornell University, in Ithaca, New York. In the absence of soil tests, these references together with this publication can be used to determine the applications of lime and fertilizer needed for various crops.

In addition to the crops listed in table 6, specialty crops, including vegetable and fruit crops, vineyards, and orchards, are an important part of the agriculture in Chautauqua County. Most of the specialty crops are grown in the lake plain region, where climatic factors are favorable.

In 1982, 3,454 acres of vegetables was harvested in Chautauqua County. The vegetables, mainly tomatoes, sweet corn, and cabbage, are grown commercially on silty lacustrine soils, such as Collamer and Niagara soils. Small fruit crops, mainly strawberries and raspberries, are grown mostly on moderately well drained and well drained, gravelly scils that formed in glacial outwash. Snap beans are grown in various areas on the better drained soils in the major valleys.

All of the vineyards and most of the orchards in the county are near Lake Erie, where climatic factors are favorable. Chautauqua County is the leading grape-producing county in New York State, with 19,166 acres of vineyards *(15)*. Because grapes are more tolerant of drainage extremes than most other fruit crops, they can be grown on a wide variety of soils; however, it should be noted that the longevity and ease of management of vineyards generally are more favorable on the well drained or moderately well drained, loamy soils.

The latest information and suggestions for growing orchard, vineyard, and vegetable crops and their estimated yields can be obtained from the local office of the Cooperative Extension Service or the Soil Conservation Service.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are

likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils generally are grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol,* a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *X,* stones or rocks on the surface; *W,* excess water in or on the soil; *T,* excessive alkalinity, acidity, sodium salts, or other toxic substances in the soil; *D,* restricted rooting depth caused by bedrock, a hardpan, or other restrictive layers; *C,* clay in the upper part of the soil; *S,* sandy texture; and *F,* high content of rock fragments in the soil profile. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 8, *slight, moderate,* and *severe* indicate the

degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that erosion can occur as a result of site preparation or cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 16. A rating of *slight* indicates that no particular preventive measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities. The proper construction and maintenance of roads, trails, landings, and fire lanes can reduce the erosion hazard.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. If soil wetness is a factor, equipment use is restricted for a period of less than 2 months. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 2 to 6 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment or the season of use. If soil wetness is a factor, equipment use is restricted for more than 6 months. Choosing the best suited equipment and deferring the use of harvesting equipment during wet periods help to overcome the equipment limitation.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary. Selection of special planting stock and special site preparation, such as bedding, furrowing, and a surface drainage system, can reduce the seedling mortality rate.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees but do not uproot them. A rating of *moderate* indicates that a few trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods. The use of special equipment that does not damage surficial root systems during partial cutting operations can reduce the hazard of windthrow. Care in thinning or not thinning at all also can reduce the hazard.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class,* a number, represents an expected volume produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. One cubic meter per hectare equals 14.3 cubic feet per acre.

The first species listed under *common trees* for a soil is the indicator species for that soil. This species is common in the survey area. It generally is the most productive species on the soil. The productivity class of the indicator species is the number in the ordination symbol.

Trees to plant are those that are suitable for commercial wood production on the soil.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of

the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties generally are favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and

features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggartick, quackgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, birch, cherry, maple, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, yew, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, burreed, pickerelweed, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadow vole, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallow.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to

bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations

are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil

material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less

than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability in the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and restricted depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Taxonomic Units and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification; for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent;

moderate, 3 to 6 percent; and *high,* more than 6 percent. *Very high,* greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Soils in table 17 may be assigned to two hydrologic soil groups. Dual grouping is used for one of two reasons. Some soils have a seasonal high water table but can be drained. In this instance, the first letter is for drained areas and the second is for undrained areas. For some soils that are less than 20 inches deep over bedrock, the first letter is for areas where the bedrock is cracked and pervious and the second is for areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). *Common* is used when the occasional and frequent classes are grouped for certain purposes. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in

organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched or apparent; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Taxonomic Units and Their Morphology." The soil samples were tested by the New York Department of Transportation, Soil Mechanics Bureau.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); Moisture density—T 99 (AASHTO), D 698 (ASTM); and Linear shrinkage—T 92 (AASHTO), D 427 (ASTM).

Relationship Between Parent Material, Landscape Position, and Drainage Class of the Soils

Table 19 shows the relationship between some of the factors that have influenced the development and morphology of the soils in Chautauqua County. The soils are grouped according to the type of landscape positions on which they occur. These landscape positions include uplands, outwash plains, terraces and alluvial fans; lacustrine plains and deltas; flood plains; and swamps and bogs. The soils that are on similar landscapes are grouped according to their depth over bedrock. The soils are also grouped by texture and by morphology of the parent material in which they formed Finally, the soils are grouped by drainage class.

Soils that have the same parent material, soil depth, and landscape position but are in a different drainage class form a soil catena. Dunkirk, Collamer, and Niagara soils are examples of soils that form a catena in Chautauqua County. Some soils, such as Canandaigua soils, have drainage features that place them in more than one drainage class. These soils are listed more than once in the table.

The relationship between the position of selected

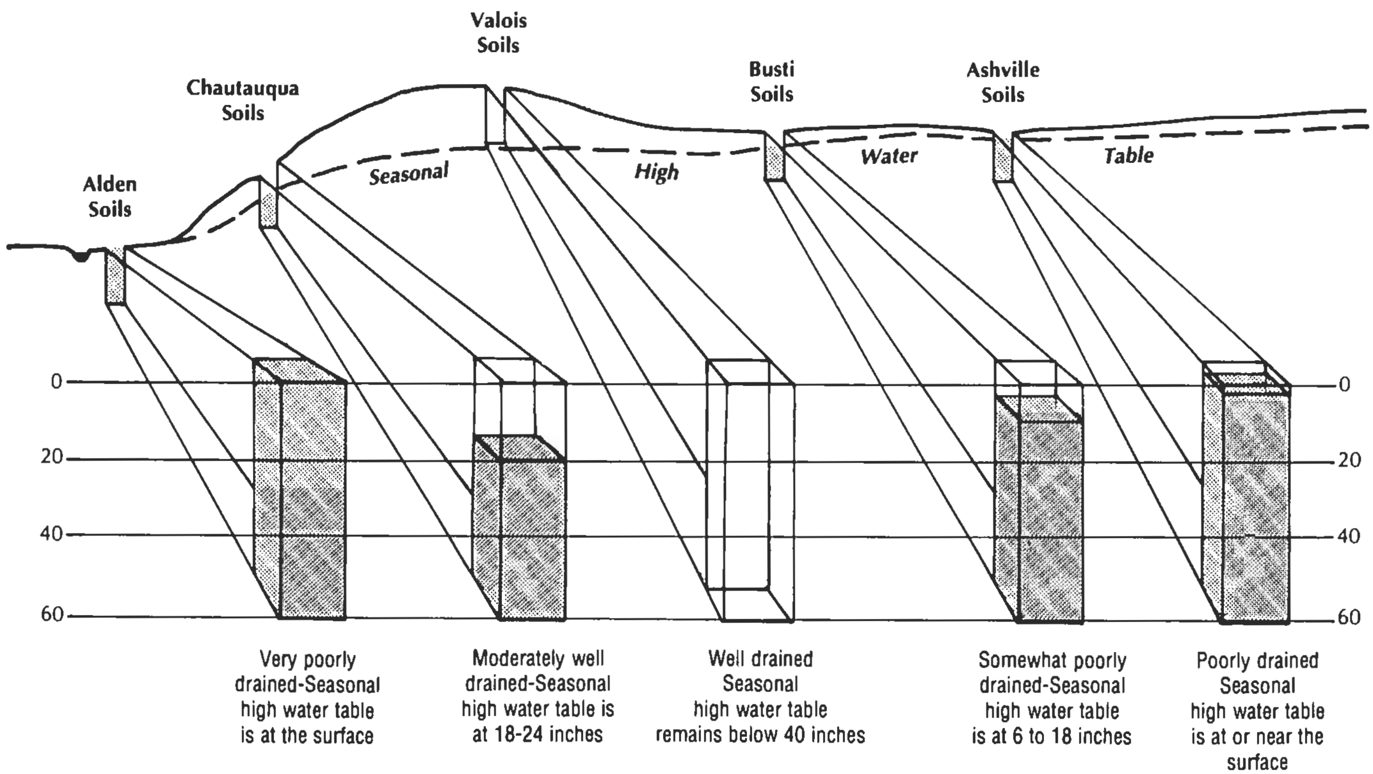

Figure 15.—A representative landscape showing the relative location of some important soils and the depth to a seasonal high water table.

soils on the landscape and depth to a seasonal high water table is shown in figure 15. Areas in which the water table is closest to the surface generally are in the lowest positions on the landscape.

The information in table 19 establishes general relationships among the soils in the county. It supplements the information provided in the section "Formation of the Soils." Detailed information on the morphology and characteristics of each soil is provided in the section "Taxonomic Units and Their Morphology."

Engineering Properties of Geologic Deposits

By Edward Fernau, soils engineer, New York State Department of Transportation.

The geologic deposits that occur in Chautauqua County include glacial till, residuum, outwash, delta deposits, beach ridge deposits, lacustrine deposits, alluvium, and organic deposits. The significance of each kind of deposit for engineering is influenced to a great extent by its mode of deposition. This, in turn, determines the texture of the material and the internal structure of the landform that includes the deposit. Among the influences are the position on the landscape and the depth to the water table.

In Chautauqua County the geologic deposits are divided into the following categories: deep till and residual deposits; shallow-to-rock deposits; stratified, coarse textured deposits; stratified, fine textured deposits; and organic deposits. These deposits are described in the following paragraphs.

Deep till and residual deposits.—Deep till deposits are unstratified, highly variable mixtures of all particle sizes ranging from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and was deposited as ground moraines, lateral moraines, or recessional moraines.

Residual deposits were formed by the weathering of bedrock in place. Bedrock is generally at a depth of more than 5 feet, but in some small areas it is closer to the surface or occurs as rock outcrops. The individual rock and mineral fragments in the soil generally reflect the types of bedrock in the immediate area.

Soils that formed in mixed, deep till deposits include Alden, Ashville, Busti, Chadakoin, Chautauqua, Darien, Erie, Fremont, Langford, Mardin, Schuyler, and Volusia soils. Valois soils formed in till deposits on moraines. Canaseraga, Churchville, and Dalton soils have a veneer of fine textured material over mixed, deep till.

Soils that formed in deep residual deposits include

Ivory, Kinzua, and Onoville soils. These soils are the most dense and compact of the unconsolidated deposits in the county. Most of the till deposits have been subjected to the compactive weight of overriding ice. Most of the deep till and residual soils are nearly level or gently sloping, but some range from nearly level to very steep. The characteristics of many landscapes are such that cut and fill earthwork is needed in most construction. The soils commonly provide stable, relatively incompressible foundations for engineering works. Fill material from these deposits, when properly compacted, generally provides stable embankments. Steep cut slopes commonly are subject to surface sloughing and erosion. Alden soils are subject to ponding.

Shallow-to-rock deposits.—Shallow-to-rock deposits consist of a veneer of unconsolidated sediments that are underlain by bedrock. The soil material commonly is 0.5 foot to 4.0 feet thick, and rock outcrop is common in some areas. The landforms and topography generally are controlled by the bedrock.

Soils that formed in glacial till over bedded sandstone, siltstone, and shale include Hornell, Orpark, and Towerville soils. Carrollton and Frewsburg soils are examples of soils that formed in residual deposits over bedded sandstone, siltstone, and shale. Barcelona soils formed in fine textured material over till underlain by shale bedrock.

The main engineering concerns are those that relate to the bedrock and ground water. Other engineering considerations are similar to those described for the overlying material. Fill material is limited in quantity because of the restricted depth to bedrock.

Stratified, coarse textured deposits.—Materials dominated by gravel and sand sorted by glacial meltwater into layered or stratified deposits are included in this category, as well as coarser textured material deposited by fluvial action. They occupy such geologic landforms as outwash plains and terraces, beach ridges, and the coarser portions of deltas, lacustrine plains, alluvial fans, and flood plains. The strata within these deposits may be well sorted or poorly sorted and range in particle size from cobbles to silt. The deposits commonly are loose and porous and have moderately rapid or rapid permeability.

Soils that formed on gravelly outwash plains and terraces, beach ridges, and alluvial fans include Chenango, Halsey, Pompton, and Red Hook soils. Scio and Unadilla soils formed on gravelly terraces and older alluvial fans. Soils that formed in sandy areas of beaches and bars, lake plains, and deltas are Colonie, Elnora, Lamson, and Minoa soils. Allard, Getzville, and Swormville soils have a veneer of fine textured material over coarse textured material. Middlebury and Tioga soils formed in coarse textured alluvial material.

Coarse textured deposits generally have relatively high strength and low compressibility. Because of their loose and porous nature, most of these deposits are not highly erodible but are subject to settlement when vibrated. Middlebury and Tioga soils are occasionally flooded for brief periods. Lamson soils are subject to ponding.

These deposits of gravel and sand have many uses as construction material. Their uses depend on gradation, soundness, and plasticity. They are sources of sand and gravel for general use, and they may be used as fill material for highway embankments, in parking areas and other developments, and on construction sites where this material is needed to reduce stress on the underlying soils. They may also be used as subbase for pavements; wearing surfaces for driveways, parking lots, and some roads; material for highway shoulders; and free draining backfill for structures and pipes. In addition, they may be used outside shells of dams for impounding water and as slope protection blankets to drain and help stabilize wet, cut slopes.

Stratified, fine textured deposits.—Deposits in this category consist of lacustrine, fine textured sediment transported by glacial meltwater and deposited in quiet proglacial lakes and ponds.

Rhinebeck soils formed in deep, lake-laid deposits of silt and clay. Canadice, Canandaigua, Collamer, Dunkirk, Niagara, and Raynham soils formed in deep, silty deposits on lake plains. Hinesburg soils formed in a coarse textured veneer over fine textured material. Alluvial soils include Hamlin, Holderton, Teel, Wakeland, and Wayland soils. Henrietta soils formed in a thin veneer of organic material over fine textured deposits.

Because of their fine texture and high moisture content, these deposits have relatively low strength. The soils that have a high content of fine sand and silt have low compressibility but are highly erodible and are susceptible to frost action. Hamlin, Holderton, Raynham, Teel, Wakeville, and Wayland soils are occasionally flooded for brief periods. Canandaigua, Henrietta, and Wayland soils are subject to ponding.

The fine textured deposits are difficult to use for engineering works, especially in areas that are flat, wet, and subject to ponding. Sites to be used for embankments and heavy structures or buildings on all of the soils that formed in these finer textured sediments must be investigated for strength and settlement characteristics and for the effects of ground water.

Organic deposits.—Organic deposits consist mainly of accumulations of plant remains. In some places they

include a minimal amount of mineral soil material. These deposits occur in very poorly drained depressional areas, in bogs that are covered with water during most of the year, or in freshwater marsh areas.

Carlisle and Palms soils formed in organic material, and Saprists formed in freshwater marsh areas. The soils that formed in organic deposits are entirely unsuitable for foundations for engineering works because they are wet, weak, and highly compressible. Generally, the organic material should be removed to a depth where there is suitable underlying material and should be replaced with suitable backfill. Placing fill material over organic deposits results in long-term settlement.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu,* meaning water, plus *ept,* from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl,* meaning minimal horizonation, plus *aquept,* the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that is better drained than the typical subgroup. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Taxonomic Units and Their Morphology

In this section, each taxonomic unit recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each taxonomic unit. The soil is compared with similar soils and with nearby soils of other taxonomic units. A pedon, a small three-dimensional area of soil, that is typical of the taxonomic unit in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(10)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(12)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the taxonomic unit.

The map units of each taxonomic unit are described in the section "Detailed Soil Map Units."

Alden Series

The Alden series consists of very deep, very poorly drained, nearly level soils on till plains. These soils formed in silty local colluvium and in the underlying

glacial till derived from silty shale and smaller amounts of sandstone. Slopes range from 0 to 3 percent.

Alden soils are associated with the moderately well drained Schuyler and Chautauqua soils, the somewhat poorly drained Fremont and Busti soils, and the poorly drained Ashville soils. They are in the lowest positions on the landscape and therefore receive a considerable amount of runoff from the adjacent soils. Ashville soils are at the edge of some areas of the Alden soils. Schuyler and Fremont soils have textures similar to those of Alden soils but are better drained. Alden soils have a higher content of clay than Chautauqua and Busti soils. They are finer textured than the very poorly drained Halsey soils and are not so silty as the very poorly drained Canandaigua soils.

Typical pedon of Alden mucky silt loam; in the city of Jamestown; ½ mile north of the intersection of Camp Street and Sanford Drive, 1,800 feet east of Pardee Avenue:

Ap—0 to 9 inches; black (10YR 2/1) mucky silt loam; weak medium and fine granular structure; friable; many fine roots; about 10 percent gravel; slightly acid; abrupt smooth boundary.

Eg—9 to 13 inches; gray (N 5/0) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; about 5 percent gravel; common fine roots; slightly acid; gradual smooth boundary.

Bg1—13 to 24 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct yellowish brown (10YR 5/8) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; about 10 percent gravel; few fine roots; slightly acid; gradual smooth boundary.

Bg2—24 to 35 inches; grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 5/8) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; about 10 percent gravel; slightly acid; clear wavy boundary.

2C—35 to 72 inches; dark grayish brown (10YR 4/2) gravelly loam; massive; friable; about 30 percent coarse fragments; neutral.

The thickness of the solum ranges from 24 to 36 inches. The depth to bedrock is more than 60 inches. Free carbonates, if they occur, are at a depth of more than 40 inches. The content of rock fragments ranges, by volume, from 0 to 15 percent in the solum and from 15 to 35 percent in the substratum. Reaction is slightly acid or neutral in the surface layer, subsurface layer, and subsoil and is neutral to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1. The texture is very fine sandy loam, loam, or silt loam or the mucky analogs of these textures.

The Eg horizon, if it occurs, is very fine sandy loam to silt loam in the fine-earth fraction. It has few to many distinct or prominent mottles. Structure is weak or moderate, fine or medium, subangular blocky.

The B horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It has few to many distinct or prominent mottles. The texture is silt loam, very fine sandy loam, or silty clay loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is friable or firm.

The 2C horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. The texture is silty clay loam to gravelly loam. This horizon is massive or has platy structure. Consistence is friable or firm.

Allard Series

The Allard series consists of very deep, well drained, nearly level and gently sloping soils that formed in a mantle of silty deposits 20 to 40 inches deep over stratified glacial deposits. These soils are on primary terraces along streams and on the higher secondary terraces. Slopes range from 0 to 8 percent.

Allard soils are closely associated with Chenango, Pompton, and Unadilla soils and the periodically flooded Tioga and Middlebury soils. They do not have the content of gravel that is characteristic of Chenango soils or of the moderately well drained Pompton soils. The silty Unadilla soils are not underlain by stratified glacial deposits. Allard soils are adjacent to Tioga and Middlebury soils. They are higher on the landscape than those soils and are not subject to flooding.

Typical pedon of Allard silt loam, 0 to 3 percent slopes; in the town of Gerry; 1 mile south of the village of Sinclairville, 500 feet west of New York Route 60:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

Bw1—8 to 16 inches; yellowish brown (10YR 5/6) very fine sandy loam; weak fine granular structure; very friable; many fine roots and pores; strongly acid; clear wavy boundary.

Bw2—16 to 30 inches; brown (10YR 5/3) very fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; many fine pores; strongly acid; clear wavy boundary.

2C—30 to 72 inches; brown (10YR 4/3) very gravelly loamy sand; single grained; loose; few fine roots; about 40 percent gravel; moderately acid.

The thickness of the solum, or the depth to contrasting deposits, ranges from 20 to 36 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent in the solum and from 0 to 60 percent in the substratum. Reaction ranges from very strongly acid to moderately acid in the surface layer and subsoil and from strongly acid to neutral in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam, very fine sandy loam, or loam.

The Bw horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 3 to 8. The texture is silt loam or very fine sandy loam. Structure is weak or moderate, granular or subangular blocky. Consistence ranges from very friable to firm.

The 2C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. The texture ranges from sand to very gravelly loamy sand. This horizon commonly is single grained and loose.

Aquents

Aquents are very deep, very poorly drained, level, mineral soils that have a dark surface layer underlain by a cambic horizon. These soils are ponded by shallow water throughout much of the year and commonly are called freshwater marsh. They formed in sandy, silty, clayey, and loamy deposits of glacial till, lacustrine material, outwash, and alluvium of local origin. They are in low or depressional areas, commonly adjacent to natural or manmade lakes, ponds, and other bodies of open water. The soils are mapped in an undifferentiated group with Saprists.

Aquents commonly are near Alden, Canandaigua, Wayland, Lamson, and Halsey soils in the slightly higher areas where ponding may occur for brief periods early in spring. In some areas Aquents are adjacent to Palms soils, which formed in deposits of organic material that are moderately deep over mineral deposits.

Because of the variability of Aquents, a typical pedon is not described. The thickness of the surface layer typically is 5 to 12 inches but ranges from 1 to 15 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 50 percent throughout the profile. Reaction ranges from very strongly acid to moderately acid in the upper part of the profile and from strongly acid to moderately alkaline in the lower part.

The A horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 or 2. It is mucky silty clay loam to loamy sand or the gravelly analogs of the textures within that range.

The C horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. It commonly is mottled. It is silty clay loam to loamy sand or the gravelly or very gravelly analogs of the textures within that range.

Ashville Series

The Ashville series consists of very deep, poorly drained, nearly level soils on glaciated uplands. These soils formed in silty local colluvium and in glacial till derived from the underlying silty shale and smaller amounts of sandstone. Slopes range from 0 to 3 percent.

Ashville soils are associated with the moderately well drained Schuyler and Chautauqua soils, the somewhat poorly drained Fremont and Busti soils, and the very poorly drained Alden soils. They are slightly better drained than Alden soils and generally receive less runoff from the adjacent soils. Schuyler and Fremont soils have textures similar to those of the Ashville soils but are better drained. Ashville soils have a higher content of clay than Chautauqua and Busti soils. They are not so silty as the poorly drained Canandaigua soils.

Typical pedon of Ashville silt loam; in the town of North Harmony; 1,500 feet west of County Route 83, about 1,200 feet southwest of the intersection of County Route 83 and New York Route 394:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, light brownish gray (10YR 6/2) dry; moderate fine and medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

Bg1—9 to 12 inches; grayish brown (10YR 5/2) silt loam; common medium distinct brownish yellow (10YR 6/8) and strong brown (7.5YR 5/8) mottles; weak fine and medium subangular blocky structure; friable; many fine roots; light gray (10YR 6/1) faces of peds; about 5 percent gravel; neutral; abrupt smooth boundary.

Bg2—12 to 21 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct strong brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; light brownish gray (10YR 6/2) faces of peds; friable; about 10 percent gravel; moderately acid; clear smooth boundary.

Bg3—21 to 36 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown

(10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; about 10 percent gravel; moderately acid; clear smooth boundary.

2C—36 to 72 inches; brown (10YR 5/3) gravelly silt loam; massive; friable; about 30 percent gravel; moderately acid.

The thickness of the solum ranges from 25 to 45 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 15 percent in the solum and from 10 to 50 percent in the substratum. Reaction ranges from strongly acid to neutral in the surface layer, from moderately acid to neutral in the subsoil, and from moderately acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR; value of 2 or 3, 6 or 7 dry; and chroma of 1 or 2. The texture is loam or silt loam.

The E horizon, if it occurs, has hue of 10YR to 5Y or is neutral in hue. It has value of 6 or 7 and chroma of 0 or 1. The texture is loam, silt loam, or very fine sandy loam in the fine-earth fraction. Consistence is very friable or friable.

The B horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 or 2. It has few to many faint or distinct, high- or low-chroma mottles. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Structure is weak or moderate, subangular blocky. Consistence is firm or friable.

The 2C horizon has colors similar to those of the B horizon. The texture is silt loam, loam, or fine sandy loam in the fine-earth fraction. This horizon is massive or has weak or moderate, platy structure. Consistence is friable or firm.

Barcelona Series

The Barcelona series consists of deep, somewhat poorly drained, nearly level and gently sloping soils on glacial lake plains. These soils formed in silty lacustrine sediment over glacial till. Soft, weathered shale is at a depth of 40 to 60 inches. Slopes range from 0 to 8 percent.

Barcelona soils are closely associated with Canandaigua, Canadice, Niagara, Rhinebeck, Minoa, and Collamer soils. They have textures similar to those of Canandaigua and Niagara soils but also are underlain by glacial till and shale bedrock. They do not have the sandy textures that are typical of Minoa soils, and they have a lower content of clay than Rhinebeck and Canadice soils.

Typical pedon of Barcelona silt loam, 0 to 3 percent slopes; in the town of Sheridan; ¼ mile west of the intersection of West Sheridan Road and Center Road, 20 feet south of West Sheridan Road:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

BEg—9 to 15 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; grayish brown (10YR 5/2) faces of peds; clay flows in pores and on faces of peds; moderate fine subangular blocky structure; friable; about 2 percent rock fragments; few fine roots; slightly acid; clear wavy boundary.

Bt—15 to 29 inches; brown (10YR 4/3) silty clay loam; common medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; gray (10YR 5/1) faces of peds; moderate medium subangular blocky structure; firm; few fine roots; distinct clay films lining pores and on faces of peds; about 2 percent rock fragments; neutral; clear wavy boundary.

2BC—29 to 35 inches; brown (10YR 5/3) channery silt loam; common medium distinct gray (10YR 5/1) mottles; weak medium subangular blocky structure; firm; about 15 percent rock fragments; neutral; clear wavy boundary.

2C—35 to 51 inches; brown (10YR 5/3) very channery silt loam; massive; firm; about 35 percent rock fragments; mildly alkaline; abrupt smooth boundary.

3R—51 inches; dark, rippable shale bedrock.

The thickness of the solum ranges from 20 to 50 inches. The depth to rippable bedrock, typically shale and siltstone, ranges from 40 to 60 inches. The content of rock fragments consisting mainly of channery fragments and gravel ranges, by volume, from 0 to 5 percent in the surface layer and the upper part of subsoil and from 15 to 50 percent in the lower part of the subsoil and in the substratum. Reaction ranges from moderately acid to neutral in the surface layer and from moderately acid to mildly alkaline in the subsurface layer, subsoil, and substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam, very fine sandy loam, or loam in the fine-earth fraction.

The BEg horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2. The texture is silt loam, silty clay loam, or very fine sandy loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silt loam or silty clay loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, angular or

subangular blocky. Consistence is friable or firm.

The 2BC and 2C horizons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silt loam, silty clay loam, or loam in the fine-earth fraction. Consistence is friable or firm.

The 3R horizon is horizontally bedded shale or siltstone.

Busti Series

The Busti series consists of very deep, somewhat poorly drained, nearly level to sloping soils on uplands. These soils formed in glacial till derived from siltstone, sandstone, and smaller amounts of shale. Slopes range from 0 to 15 percent.

Busti soils are in a drainage sequence that includes the well drained Chadakoin soils and the moderately well drained Chautauqua soils. They are associated with Fremont, Darien, Volusia, and Erie soils. They also are associated with Orpark soils, which are moderately deep and have bedrock at a depth of 20 to 40 inches. They do not have the firm fragipan that is characteristic of Volusia and Erie soils, and they have less clay than Fremont and Darien soils.

Typical pedon of Busti silt loam, 8 to 15 percent slopes; in the town of Busti; ½ mile east of the intersection of Forest Avenue Extension and Garfield Road, 150 feet north of Garfield Road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular or subangular blocky structure; friable; many fine roots; about 10 percent gravel; neutral; abrupt smooth boundary.

Bw1—8 to 12 inches; dark grayish brown (10YR 5/3) silt loam; common medium distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/6) mottles; weak medium and fine subangular blocky structure; friable; common fine roots; about 10 percent gravel; slightly acid; clear wavy boundary.

Bw2—12 to 19 inches; brown (10YR 4/3) silt loam; common medium distinct brown (7.5YR 5/4) and light brownish gray (10YR 6/2) mottles; grayish brown (2.5Y 5/2) faces of peds; weak medium and fine subangular blocky structure; firm; few fine roots; about 10 percent gravel; slightly acid; clear smooth boundary.

BC—19 to 27 inches; brown (10YR 4/3) gravelly silt loam; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; massive; firm; about 30 percent gravel; slightly acid; clear smooth boundary.

C—27 to 72 inches; dark grayish brown (10YR 4/2) gravelly silt loam; massive; firm; about 30 percent gravel; slightly acid.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 15 percent in the surface layer, from 10 to 25 percent in the subsoil, and from 15 to 35 percent in the substratum. Reaction ranges from moderately acid to neutral throughout the profile.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam or loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction. This horizon has few to many, medium, distinct mottles. Structure is weak or moderate, fine or medium, subangular blocky. Consistence is friable or firm.

The BC horizon is similar to the B horizon but has platy structure or is massive.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction. Consistence is friable or firm.

Canadice Series

The Canadice series consists of very deep, poorly drained soils that formed in glacial lake sediment that has a high content of clay. These soils are in slightly depressional areas in old glacial lake basins. Slopes range from 0 to 3 percent.

Canadice soils are the poorly drained member of a drainage sequence that includes the somewhat poorly drained Rhinebeck soils. They are associated with Canandaigua, Lamson, Niagara, and Raynham soils. They have a higher content of clay in the subsoil than the silty Canandaigua soils and the sandy Lamson soils. They are less well drained than Niagara and Raynham soils and have a higher content of clay.

Typical pedon of Canadice silty clay loam; about 3 miles southwest of Dunkirk; 100 feet east of the intersection of Hall Road and New York Route 5, 50 feet south of New York Route 5:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, light gray (10YR 6/1) dry; moderate coarse angular blocky structure; friable; slightly plastic; moderately acid; abrupt smooth boundary.

Btg1—9 to 24 inches; grayish brown (2.5Y 5/2) silty clay; common fine and medium distinct yellowish brown (10YR 5/4, 5/6, and 5/8) mottles; moderate and strong very coarse prismatic structure parting to weak and moderate medium angular blocky; firm, plastic, sticky; thin gray (2.5Y 5/1) clay films on faces of peds; slightly acid; clear wavy boundary.

Btg2—24 to 32 inches; grayish brown (2.5Y 5/2) silty clay; many fine and medium distinct yellowish brown (10YR 5/4, 5/6, and 5/8) mottles; moderate and strong very coarse prismatic structure parting to weak and moderate coarse and very coarse angular blocky; firm, plastic, sticky; thin gray (2.5Y 5/1) clay films on faces of peds; neutral; gradual wavy boundary.

BCg—32 to 40 inches; gray (2.5Y 5/1) silty clay; common distinct yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm, plastic, sticky; mildly alkaline; gradual wavy boundary.

Cg—40 to 72 inches; grayish brown (2.5Y 5/2) silty clay; few medium distinct grayish brown (10YR 4/2) and gray (N 5/0) mottles; massive; firm; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 28 to 58 inches. The depth to bedrock is more than 60 inches. Rock fragments commonly do not occur in the profile, but in some pedons they make up as much as 5 percent of the profile. Reaction ranges from very strongly acid to slightly acid in the surface layer, from strongly acid to neutral in the upper part of the B horizon, from slightly acid to mildly alkaline in the lower part of the B horizon, and from neutral to moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. Structure is weak or moderate, fine to coarse, subangular or angular blocky. The texture is silt loam or silty clay loam.

The B horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The texture ranges from silty clay loam to clay. Structure is coarse or very coarse prismatic parting to moderate, medium, subangular blocky.

The BCg and Cg horizons have colors and textures similar to those of the B horizon. The Cg horizon typically is massive or varved.

Canandaigua Series

The Canandaigua series consists of very deep, poorly drained and very poorly drained, nearly level soils that formed in lacustrine deposits of silt, very fine sand, and clay. These soils are on glacial lake plains, in narrow drainageways, in basinlike areas in the larger valleys, and in depressional areas on uplands, where water-sorted deposits have accumulated. Slopes range from 0 to 3 percent.

Canandaigua soils are in a drainage sequence that includes the moderately well drained Collamer soils and the somewhat poorly drained Niagara soils. They are associated with Alden, Ashville, Canadice, and Lamson soils. In the uplands, they are in landscape positions similar to those of Ashville soils; however, they do not have the content of rock fragments that is typical of Ashville soils. At the lower elevations, they are in landscape positions similar to those of Alden, Canadice, and Lamson soils. They contain less clay than Canadice soils and more silt and clay than the sandy Lamson soils. They do not have the content of rock fragments that is typical of Alden soils.

Typical pedon of Canandaigua silt loam, loamy substratum; in the town of Pomfret; 120 feet south of Van Buren Road and ¼ mile west of Interstate 90:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky and moderate very fine granular structure; friable; many fine roots; many medium and coarse pores; neutral; abrupt smooth boundary.

Bg1—10 to 16 inches; grayish brown (2.5Y 5/2) silty clay loam; many (30 percent) medium distinct strong brown (7.5YR 5/6) and dark brown (7.5YR 4/4) mottles; moderate medium and coarse subangular blocky structure; friable; common fine roots; common fine vesicular and tubular pores and few medium pores; neutral; clear wavy boundary.

Bg2—16 to 36 inches; grayish brown (2.5Y 5/2) silt loam; grayish brown (2.5Y 5/2) prism faces coated with silt and some clay grading to gray (5Y 5/1) in the lower 8 inches of the horizon; many (35 percent) medium and coarse distinct dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) mottles and common medium faint gray (5Y 6/1) mottles; moderate very coarse prismatic structure parting to weak coarse subangular blocky; friable; few fine roots along prism faces; common fine vesicular and tubular pores; patchy silt and clay flows in tubular pores; neutral; gradual wavy boundary.

C1—36 to 45 inches; brown (10YR 4/3) silt loam; common medium distinct gray (10YR 5/1) and strong brown (7.5YR 5/6) mottles; massive; firm; common pores; about 5 percent gravel; mildly alkaline; slightly effervescent; clear smooth boundary.

2C2—45 to 60 inches; brown (10YR 4/3), gray (10YR 5/1), and strong brown (7.5YR 5/6) silt loam; weak medium platy structure; firm; common fine and medium pores; about 10 percent gravel; mildly alkaline; slightly effervescent; abrupt smooth boundary.

3C3—60 to 72 inches; dark gray (N 4/0) gravelly silt loam; massive; firm; few fine pores; about 20

percent gravel; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock or to contrasting material is more than 60 inches. Rock fragments commonly do not occur in the profile, but in some pedons they make up as much as 10 percent of the profile. The depth to free carbonates ranges from 18 to 60 inches. Reaction ranges from moderately acid to mildly alkaline in the solum and from neutral to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The texture is silt loam, very fine sandy loam, loam, or fine sandy loam or the mucky analogs of these textures.

The Bg horizon has hue of 5YR to 2.5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. The texture is silt loam, very fine sandy loam, or silty clay loam. Structure is weak to strong, very fine to coarse, subangular blocky. Consistence is friable or firm.

The C horizon has hue of 5YR to 5Y, value of 3 to 6, and chroma of 1 to 3. The texture is silty clay loam, silt loam, or loam. This horizon is massive or has platy structure. Consistence is friable or firm.

The 2C and 3C horizons have colors similar to those of the C horizon. These horizons are massive or have platy structure. The textures are similar to those of the C horizon, but the gravelly analogs of these textures do not occur in all pedons.

Canaseraga Series

The Canaseraga series consists of very deep, well drained and moderately well drained, gently sloping and sloping soils that formed in a silty mantle overlying firm glacial till derived from siltstone, brittle shale, and some sandstone. These soils are on side slopes and in convex areas on hilltops of glaciated and dissected uplands. Slopes range from 3 to 15 percent.

Canaseraga soils are in a drainage sequence that includes the somewhat poorly drained Dalton soils. Canaseraga, Mardin, Schuyler, Chadakoin, and Chautauqua soils are in similar positions on the landscape. Canaseraga soils have a mantle of silty material that is not present in areas of the Mardin soils and contain less clay than Schuyler soils. Also, they have a dense fragipan that is not present in Schuyler, Chadakoin, and Chautauqua soils.

Typical pedon of Canaseraga silt loam, 8 to 15 percent slopes; in the town of French Creek; ½ mile east of the intersection of New Road and Gilmore Road, in a road cut on New Road:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bw1—2 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw2—12 to 23 inches; brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable; common roots; strongly acid; abrupt wavy boundary.

2Bx—23 to 55 inches; brown (10YR 5/3) gravelly loam that has tongues of brown (10YR 4/3) silt loam extending around 8- to 16-inch prisms in the upper 8 inches of the horizon; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; 1- to 2-inch streaks having yellowish brown (10YR 5/6) exteriors and light brownish gray (10YR 6/2) interiors; very coarse prisms parting to moderate medium subangular blocky structure; firm and slightly brittle; about 25 percent gravel; strongly acid; clear wavy boundary.

2Cd—55 to 72 inches; dark brown (10YR 4/3) gravelly loam; common medium distinct yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; massive; firm; about 25 percent gravel; moderately acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is 60 inches or more. The thickness of the silty mantle ranges from 15 to 36 inches, and in some pedons the silty mantle extends into the upper part of the fragipan. The content of rock fragments ranges, by volume, from 0 to 10 percent in the silty mantle and from 10 to 40 percent below the mantle. Reaction ranges from very strongly acid to moderately acid in the surface layer and subsoil, from strongly acid to neutral in the fragipan, and from moderately acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is very fine sandy loam, loam, or silt loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The texture is very fine sandy loam or silt loam. Structure is weak or very weak, fine or medium, granular or blocky. Consistence is friable or very friable.

The Bx horizon has hue of 5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. It has few or common, faint or distinct mottles. The texture is silt loam or loam in the fine-earth fraction. Consistence is firm or very firm and brittle.

The Cd horizon has the same range in color and texture as the Bx horizon. It is massive or has weak or moderate, thick, platy structure. Consistence is firm or very firm.

Carlisle Series

The Carlisle series consists of very deep, very poorly drained, organic soils that formed in black, well decomposed, herbaceous and woody plant remnants. The organic deposits are more than 51 inches deep. These soils are in bogs on the lake plains and outwash plains. Slopes range from 0 to 3 percent.

Carlisle soils are in landscape positions similar to those of Palms, Henrietta, Halsey, and Canandaigua soils. They are deeper to contrasting deposits than Palms soils, which are underlain by mineral soil material at a depth of 16 to 51 inches, and Henrietta soils, which are underlain by sand at a depth of less than 16 inches. Carlisle soils also have an organic layer that is thicker than that of the gravelly Halsey soils and the silty Canandaigua soils.

Typical pedon of Carlisle muck; in the city of Jamestown; 1,800 feet west of Lafayette Street and 400 feet north of 11th Street:

Oa1—0 to 42 inches; sapric material that is black (10YR 2/1), broken face; about 5 percent coarse fragments, less than 5 percent rubbed; weak fine granular structure; friable; slightly acid; clear smooth boundary.

Oa2—42 to 90 inches; sapric material that is dark reddish brown (5YR 3/3), broken face, and dusky red (2.5YR 3/2), rubbed, in the upper part and very dark grayish brown (10YR 3/2), broken face, and very dark brown (10YR 2/2), rubbed, in the lower part; about 35 percent fiber, 5 percent rubbed; moderate thick platy structure parting to moderate medium and fine subangular blocky; nonsticky; herbaceous fibers; slightly acid.

Depth to the underlying mineral soil material is more than 51 inches. The depth to bedrock is more than 60 inches. Reaction ranges from moderately acid to neutral in the organic material. The content of coarse woody fragments ranges from 0 to 20 percent.

The organic material has hue of 5YR to 10YR, broken face, or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. Structure is weak or medium, fine granular, blocky, or platy, or the material is massive.

Carrollton Series

The Carrollton series consists of moderately deep, well drained, gently sloping to moderately steep soils that formed in material weathered from interbedded shale, siltstone, and sandstone. These soils are in areas on hilltops and side slopes where the topography is influenced by the underlying bedrock. Slopes range from 3 to 25 percent.

Carrollton soils are in a drainage sequence that includes the somewhat poorly drained Frewsburg soils. Chautauqua, Schuyler, Valois, Kinzua, and Onoville soils are on associated landscapes. Carrollton soils have bedrock at a depth of 20 to 40 inches, but Kinzua and Onoville soils have bedrock at a depth of more than 40 inches. Carrollton soils are shallower over bedrock than the very deep Valois, Schuyler, and Chautauqua soils, which are at the lower elevations and formed in glacial till.

Typical pedon of Carrollton channery silt loam, 8 to 15 percent slopes; in the town of Carroll; 500 feet west of the intersection of Oak Hill Road and County Route 336, 20 feet north of County Route 336:

Ap—0 to 4 inches; dark brown (10YR 3/3) channery silt loam, pale brown (10YR 6/3) dry; weak medium and coarse granular structure; friable; common fine roots; 15 percent rock fragments; very strongly acid; clear smooth boundary.

BE—4 to 10 inches; yellowish brown (10YR 5/6) channery silt loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; about 20 percent rock fragments; very strongly acid; gradual smooth boundary.

Bt1—10 to 17 inches; strong brown (7.5YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; common distinct clay films on faces of some peds and lining pores; about 15 percent rock fragments; very strongly acid; gradual smooth boundary.

Bt2—17 to 27 inches; yellowish brown (10YR 5/4) channery silt loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; common fine pores; common distinct clay films lining pores and on faces of some peds; about 20 percent rock fragments; very strongly acid; abrupt smooth boundary.

R—27 inches; olive gray (5Y 4/2) siltstone and shale.

The thickness of the solum ranges from 18 to 36 inches. Rippable bedrock is at a depth of 20 to 40 inches. The content of rock fragments consisting mainly of channery fragments and flagstones ranges, by volume, from 15 to 35 percent in the surface layer and subsoil. Reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 3

or 4, and chroma of 1 to 4. The texture is silt loam or loam in the fine-earth fraction.

The BE horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The texture is loam or silt loam in the fine-earth fraction.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. The texture is silt loam, loam, silty clay loam, or clay loam in the fine-earth fraction. Structure is weak or moderate, angular or subangular blocky. Consistence is friable or firm.

The R horizon is horizontally bedded siltstone, shale, or fine grained sandstone.

Chadakoin Series

The Chadakoin series consists of very deep, well drained, gently sloping to very steep soils on glaciated uplands. These soils formed in glacial till derived from sandstone, siltstone, and shale. They are on upland till plains, hilltops, and valley sides. Slopes range from 3 to 50 percent.

Chadakoin soils are in a drainage sequence that includes the moderately well drained Chautauqua soils, the somewhat poorly drained Busti soils, and the poorly drained Ashville soils. They are associated on the landscape with Langford, Valois, Schuyler, Towerville, and Chenango soils. Chadakoin soils do not have the fragipan that is typical of Langford soils. They have less clay than Schuyler and Towerville soils and have less gravel in the subsoil than Valois and Chenango soils. Valois and Chenango soils are on stream terraces and on the lower lying lateral moraines in valleys.

Typical pedon of Chadakoin silt loam, 15 to 25 percent slopes; in the town of Westfield; 1.3 miles north of the intersection of Parker Road and New York Route 76, 15 yards west of Parker Road:

Ap—0 to 4 inches; dark gray brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine and medium roots; about 5 percent gravel; strongly acid; clear smooth boundary.

Bw1—4 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine and medium and few large roots; common fine tubular pores; about 5 percent gravel; strongly acid; clear smooth boundary.

Bw2—13 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine and few medium roots; many fine tubular and few medium vesicular pores; about 10 percent gravel; strongly acid; clear wavy boundary.

BC—24 to 43 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak medium subangular blocky structure; friable; few fine roots; common medium tubular pores; about 20 percent gravel; strongly acid; gradual wavy boundary.

C—43 to 72 inches; dark brown (7.5YR 4/4) gravelly loam; massive; friable; about 30 percent gravel; moderately acid.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 30 percent in the upper part of the solum, from 15 to 35 percent in the lower part of the solum, and from 20 to 40 percent in the substratum. Reaction ranges from very strongly acid to moderately acid in the solum and from strongly acid to slightly acid in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is silt loam, loam, or fine sandy loam. Structure is weak or moderate, fine to coarse, subangular blocky or granular. Consistence is very friable or friable.

The BC horizon has hue, value, and chroma similar to those of the B horizon. The texture is sandy loam, silt loam, or loam in the fine-earth fraction. Structure is weak, fine or medium, subangular blocky or platy. Consistence is friable or firm.

The C horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is sandy loam, silt loam, or loam in the fine-earth fraction. Consistence is friable or firm.

Chautauqua Series

The Chautauqua series consists of very deep, moderately well drained, nearly level to moderately steep soils on glaciated uplands. These soils formed in glacial till derived mainly from siltstone, fine grained sandstone, and smaller amounts of shale. They are on till plains, hilltops, and valley side slopes. Slopes range from 0 to 25 percent.

Chautauqua soils are in a drainage sequence that includes the well drained Chadakoin soils, the somewhat poorly drained Busti soils, and the poorly drained Ashville soils. They are associated on the landscape with Langford, Mardin, Schuyler, and Towerville soils. They do not have the fragipan that is typical of Langford and Mardin soils. They have less clay than Schuyler and Towerville soils and are deeper over bedrock than Towerville soils.

Typical pedon of Chautauqua silt loam, 3 to 8 percent slopes; in the town of Carroll; 100 yards west of Hill Road and 10 yards south of the power line along the town line separating Carroll and Poland:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; friable; many fine roots; about 10 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw1—7 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium and fine subangular blocky structure; friable; many fine roots; about 10 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—22 to 34 inches; brown (10YR 4/3) gravelly silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; light brownish gray (10YR 6/2) faces of peds; weak medium subangular blocky structure; firm; few fine roots; about 25 percent rock fragments; moderately acid; clear wavy boundary.

C1—34 to 60 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; massive; firm; about 30 percent rock fragments; moderately acid; clear wavy boundary.

C2—60 to 72 inches; dark yellowish brown (10YR 4/4) very gravelly loam; massive; friable; about 45 percent rock fragments; moderately acid.

The thickness of the solum ranges from 20 to 45 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 15 percent in the surface layer, from 5 to 30 percent in the subsoil, and from 15 to 45 percent in the substratum. Reaction is moderately acid or slightly acid in the surface layer and ranges from strongly acid to slightly acid below the surface layer.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or loam.

The Bw horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. It has few or common, fine or medium, distinct, low- and high-chroma mottles at a depth of 18 to 24 inches. The texture is silt loam or loam in the fine-earth fraction, which consists of more than 60 percent silt that includes very fine sand. Structure is weak or moderate, fine or medium, subangular blocky. Consistence ranges from very friable to firm.

The C horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction, which is more than 60 percent silt that includes very fine sand. Consistence is friable or firm.

Chenango Series

The Chenango series consists of very deep, well drained and somewhat excessively drained, nearly level to steep soils on glacial outwash plains. These soils formed on outwash terraces in the larger valleys and in positions on alluvial fans where postglacial side streams enter the major valleys (fig. 16). Slopes range from 0 to 40 percent.

Chenango soils are in a drainage sequence that includes the moderately well drained Pompton soils, the somewhat poorly drained Red Hook soils, and the very poorly drained Halsey soils. Chenango soils also are associated with Allard, Valois, Unadilla, and Tioga soils. They do not have the thick, silty mantle that is typical of Allard and Unadilla soils, and they have a well sorted, gravelly substratum in contrast to the randomly sorted substratum that is typical of Valois soils. Chenango soils have a higher content of gravel than Tioga soils and are not subject to frequent flooding.

Typical pedon of Chenango gravelly loam, 0 to 3 percent slopes; in the town of Pomfret, in the hamlet of Lily Dale; 50 feet north of South Street, next to the ballpark:

Ap—0 to 6 inches; brown (10YR 4/3) gravelly loam; moderate medium granular structure; friable; many fine roots; about 20 percent gravel; moderately acid; abrupt smooth boundary.

Bw1—6 to 27 inches; yellowish brown (10YR 5/6) gravelly silt loam; weak medium subangular blocky structure; friable; common fine roots; about 30 percent gravel; strongly acid; clear wavy boundary.

Bw2—27 to 45 inches; yellowish brown (10YR 5/4) very gravelly fine sandy loam; very weak subangular blocky structure; very friable; few roots; about 45 percent gravel; strongly acid; clear wavy boundary.

2C—45 to 72 inches; brown (10YR 4/3) very gravelly loamy sand; single grained; loose; about 55 percent gravel; moderately acid.

The thickness of the solum ranges from 24 to 50 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 20 to 60 percent in the subsoil and from 30 to 70 percent in the substratum. Reaction ranges from very strongly acid to moderately acid in the subsoil and from strongly acid to mildly alkaline in the substratum.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is sandy loam, loam, or silt loam or the gravelly or channery analogs of those textures.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is fine sandy loam, very fine sandy loam, loam, or silt loam or the gravelly or very gravelly analogs of these textures. Structure is weak or very weak, granular or subangular blocky. Consistence ranges from very friable to firm.

The 2C horizon has hue of 10YR or 2.5Y, value of 3

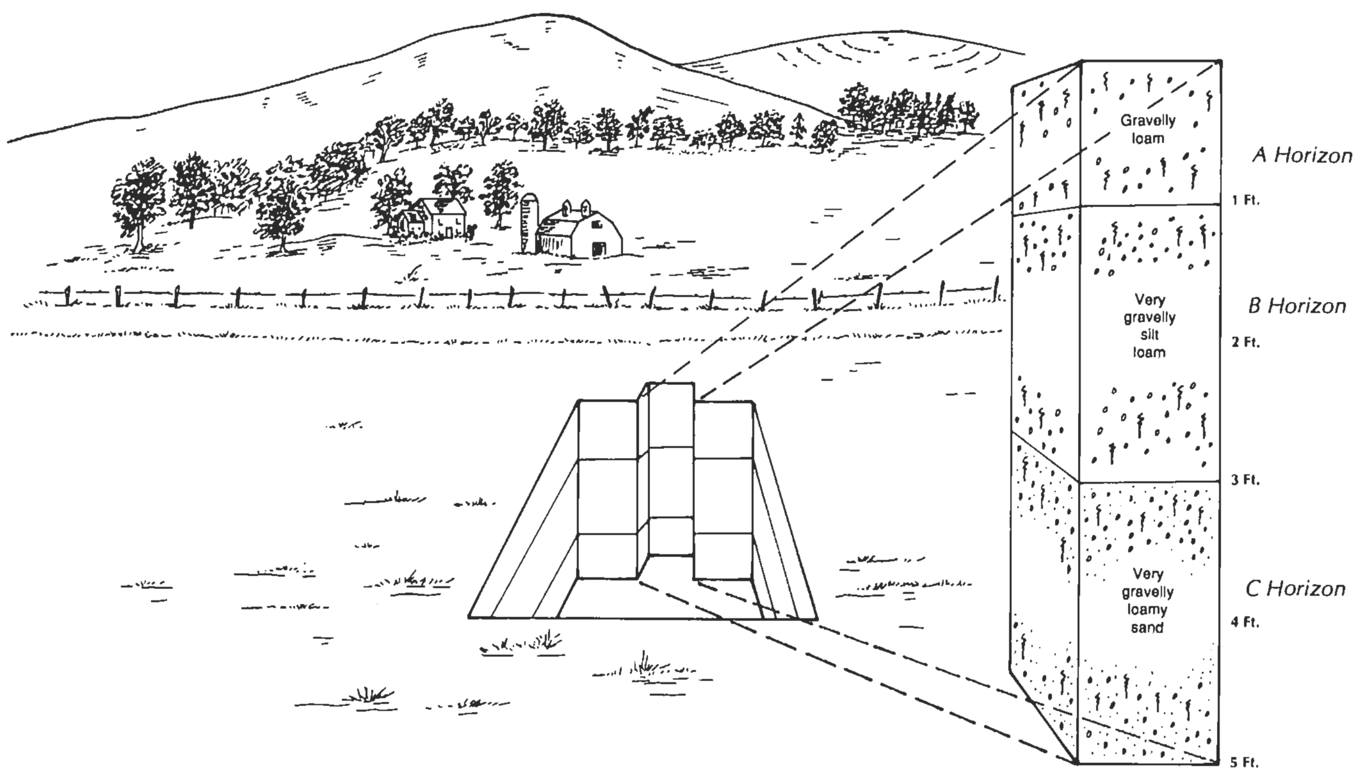

Figure 16.—A typical landscape setting for Chenango gravelly loam, 0 to 3 percent slopes. The exaggerated schematic represents the soil layers.

to 5, and chroma of 2 to 4. It is very gravelly loamy fine sand to coarse sand or stratified sand and gravel. It is massive or single grained.

Churchville Series

The Churchville series consists of very deep, somewhat poorly drained, nearly level to sloping soils on till plains. These soils formed in thin deposits of fine textured glacial lake sediment underlain by glacial till. Slopes range from 0 to 15 percent.

Churchville soils are associated with Darien, Fremont, Rhinebeck, Niagara, and Canadice soils. They are better drained than Canadice soils and have thinner deposits of clayey sediment than Rhinebeck soils. They have more clay in the subsoil than Niagara, Darien, and Fremont soils. Also, Darien and Fremont soils formed in glacial till and are not overlain by a clayey mantle.

Typical pedon of Churchville silt loam, 3 to 8 percent slopes; in the town of Sheridan; 900 feet east of the intersection of Straight Road and Livermore Road, 800 feet northeast of Straight Road:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

E—7 to 10 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and gray (10YR 5/1) mottles; weak medium and fine subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—10 to 19 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; light brownish gray (2.5Y 6/2) faces of peds; moderate medium subangular blocky structure; firm; common fine roots; common distinct clay films in pores and on faces of peds; neutral; clear wavy boundary.

Bt2—19 to 33 inches; brown (10YR 4/3) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; grayish brown (2.5Y 5/2) faces of peds; moderate medium subangular blocky structure; firm; few fine roots; common pores lined with clay; common distinct clay films on faces of peds; about 5 percent gravel; mildly alkaline; clear smooth boundary.

2C—33 to 72 inches; brown (10YR 4/3) gravelly silt loam; common distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; massive; firm; about 25 percent gravel; moderately alkaline; slightly effervescent.

The thickness of the solum and depth to the 2C horizon range from 20 to 36 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent in the solum and from 10 to 35 percent in the substratum. Reaction is moderately acid to neutral in the surface layer and subsurface layer, slightly acid to mildly alkaline in the subsoil, and mildly alkaline or moderately alkaline in the substratum.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam or silty clay loam.

The E horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam, fine sandy loam, or silty clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 or 4. It has both high- and low-chroma mottles. The texture is clay loam, silty clay loam, or silty clay. Structure is moderate or strong, medium or coarse blocky.

The 2C horizon has colors similar to those of the Bt horizon. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Consistence is firm or very firm.

Collamer Series

The Collamer series consists of very deep, moderately well drained, nearly level to sloping soils on glacial lake plains. These soils formed in silty lake-laid deposits. Slopes range from 0 to 15 percent.

Collamer soils are in a drainage sequence that includes the somewhat poorly drained Niagara soils and the poorly drained and very poorly drained Canandaigua soils. They are in positions on the landscape similar to those of Rhinebeck, Colonie, Elnora, Raynham, and Scio soils. They have a higher content of clay than Scio soils, are better drained than Raynham soils, and have a lower content of clay than Rhinebeck soils. Collamer soils also have more clay in the subsoil than the sandy Colonie and Elnora soils.

Typical pedon of Collamer silt loam, 3 to 8 percent slopes; in the town of Portland; ¼ mile north-northwest from the intersection of Route 5 and Pratt Road, at the edge of a cornfield on a bluff overlooking Lake Erie:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; moderately acid; abrupt smooth boundary.

E/B—7 to 16 inches; yellowish brown (10YR 5/4) silt loam that has some areas of brown (10YR 5/3) inside peds; weak fine and medium subangular blocky structure; friable; common fine roots; moderately acid; clear smooth boundary.

B/E—16 to 21 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; common medium distinct strong brown (7.5YR 5/8) mottles; pale brown (10YR 6/3) material 1 to 3 millimeters thick on faces of peds; weak fine and medium subangular blocky structure; friable; few fine roots; moderately acid; clear smooth boundary.

Bt1—21 to 38 inches; brown (10YR 5/3) silt loam; common medium distinct strong brown (7.5YR 5/8) and light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films lining pores and on faces of some peds; slightly acid; clear wavy boundary.

Bt2—38 to 45 inches; brown (10YR 5/3) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and gray (10YR 6/1) mottles; gray (10YR 6/1) and reddish gray (5YR 5/2) faces of peds; weak medium subangular blocky structure; firm; common faint clay films lining pores and on faces of some peds; neutral; clear wavy boundary.

C—45 to 72 inches; dark brown (10YR 4/3) silt loam; massive; firm; neutral or mildly alkaline and slightly effervescent in the lower part.

The thickness of the solum ranges from 24 to 48 inches. The depth to bedrock is more than 60 inches. The depth to carbonates ranges from 20 to 72 inches. Rock fragments commonly do not occur in the profile, but in some pedons they make up as much as 5 percent of the profile. Reaction ranges from strongly acid to neutral in the Ap, E/B, and B/E horizons, from moderately acid to mildly alkaline in the Bt horizon, and from slightly acid to moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. The texture is fine sandy loam, very fine sandy loam, or silt loam.

The E horizon, if it occurs, has hue of 5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 4. The texture is fine sandy loam or silt loam. The horizon has weak, platy or subangular blocky structure. Consistence ranges from very friable to firm.

The E/B and B/E horizons have properties on ped exteriors that are similar to those of the E horizon. Ped interiors have hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4. The texture is silt loam or loam;

however, the loam occurs only in the E part of the horizon. Structure is weak or moderate, subangular blocky. Consistence is friable or very friable.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam. It has few to many, faint or distinct mottles. This horizon has weak or moderate, subangular blocky, angular blocky, or prismatic structure. Consistence is friable or firm.

The C horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam to very fine sandy loam or stratified silt and very fine sand.

Colonie Series

The Colonie series consists of very deep, well drained to excessively drained, gently sloping and sloping soils that formed in lake-laid or windblown deposits dominated by fine sand. These soils are on remnant beaches, sandbars, and deltas of glacial lakes. Slopes range from 3 to 15 percent.

Colonie soils are in a drainage sequence that includes the moderately well drained Elnora soils, the somewhat poorly drained Minoa soils, and the poorly drained Lamson soils. They are in positions on the landscape similar to those of Chenango, Collamer, and Niagara soils. They do not have the fine-silty subsoil that is typical of Collamer and Niagara soils, and they do not have the rock fragment content that is characteristic of Chenango soils.

Typical pedon of Colonie loamy fine sand, 3 to 8 percent slopes; in the town of Portland; 500 feet north of the intersection of New York Route 5 and Mathews Road, on a bluff overlooking Lake Erie:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy fine sand; very weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

Bw1—9 to 22 inches; strong brown (7.5YR 5/6) loamy fine sand; very weak fine granular structure; very friable; many fine roots; strongly acid; clear wavy boundary.

Bw2—22 to 29 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine granular structure; very friable; common fine roots; about 2 percent gravel; strongly acid; clear wavy boundary.

Bw3—29 to 45 inches; yellowish brown (10YR 5/4) loamy fine sand; weak fine granular structure; very friable; few fine roots; about 2 percent gravel; five lamellae 0.5 to 1.0 inch thick that are brown (10YR 4/3) fine sandy loam and are massive and friable; some silt in pores; moderately acid; clear wavy boundary.

C—45 to 72 inches; brown (10YR 5/3) fine sand; single grained; loose; about 5 percent gravel; moderately acid.

The thickness of the solum ranges from 40 to 75 inches. The depth to bedrock is more than 72 inches. Rock fragments commonly do not occur in the profile, but in some pedons they make up as much as 5 percent of the profile. Reaction ranges from very strongly acid to slightly acid in the solum and from moderately acid to neutral in the substratum.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. The texture is fine sand, loamy fine sand, or very fine sandy loam.

The Bw horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is loamy fine sand or fine sand. This horizon is single grained or has weak, fine or very fine, granular structure. Consistence is loose or very friable. The horizon contains lamellae that are 0.25 inch to 3.0 inches thick and are friable or firm at a depth of 14 to 24 inches.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 to 4. The texture is fine sand or loamy fine sand. This horizon is massive or single grained. Consistence is loose or very friable.

Dalton Series

The Dalton series consists of very deep, somewhat poorly drained, nearly level and gently sloping soils that formed in a silty mantle overlying firm glacial till. These soils are on the lower side slopes of valleys and on till plains. Slopes range from 0 to 8 percent.

Dalton soils are in a drainage sequence that includes the well drained and moderately well drained Canaseraga soils. They are associated with Busti, Fremont, Erie, and Raynham soils. They have a dense fragipan that is not present in Busti and Fremont soils. They have a mantle of silty material that is not present in Erie soils. They have rock fragments throughout the profile, which are not present in Raynham soils.

Typical pedon of Dalton silt loam, 3 to 8 percent slopes; in the town of Poland; ½ mile east of the intersection of Willard Street Extension and Peck Settlement Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; about 2 percent gravel; moderately acid; abrupt smooth boundary.

Bw—9 to 14 inches; brown (10YR 5/3) silt loam; common coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; many fine roots; about 2 percent gravel; moderately acid; clear smooth boundary.

Eg—14 to 23 inches; light brownish gray (10YR 6/2) silt loam; common coarse distinct yellowish brown (10YR 5/8) and common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; many fine roots; about 2 percent gravel; slightly acid; clear irregular boundary.

2Bx1—23 to 39 inches; brown (10YR 5/3) gravelly silt loam; strong very coarse prisms 6 to 15 inches wide that contain tongues of light brownish gray (10YR 6/2) material about 1 inch wide tapering to silt coatings as depth increases; prisms bordered with ¼ inch yellowish brown (10YR 5/8) rim with grayish brown (10YR 5/2) interior; firm, slightly brittle; about 20 percent gravel; slightly acid; gradual wavy boundary.

2Bx2—39 to 46 inches; brown (10YR 5/3) gravelly silt loam; common coarse distinct light brownish gray (10YR 6/2) mottles; massive; firm, slightly brittle; about 20 percent gravel; slightly acid; gradual wavy boundary.

2Cd—46 to 72 inches; olive brown (2.5Y 4/4) gravelly silt loam; massive; firm; about 25 percent gravel; neutral.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is 60 inches or more. The thickness of the silty mantle ranges from 15 to 36 inches. The content of rock fragments consisting mainly of channery fragments and gravel ranges, by volume, from 0 to 5 percent in the silty mantle and from 15 to 40 percent in the 2Bx and 2Cd horizons. Reaction ranges from very strongly acid to moderately acid in the surface layer and in the silty mantle and from strongly acid to neutral in the Bx horizon. It is slightly acid or neutral in the Cd horizon.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The texture is silt loam or very fine sandy loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 1 to 3. The texture is silt loam or very fine sandy loam. Structure is weak, fine or medium, granular or subangular blocky. Consistence ranges from very friable to firm. This horizon has common, medium and coarse, distinct, high- and low-chroma mottles.

The Bg horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 1 or 2. The texture is silt loam or very fine sandy loam. Structure is weak, fine or medium, granular or subangular blocky. Consistence ranges from very friable to firm.

The 2Bx horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 2 or 3. The texture is silt loam or loam in the fine-earth fraction. Structure is moderate or strong, very coarse prismatic, or the material is massive. Consistence is firm or very firm.

The 2Cd horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction. Structure is platy, or the material is massive. Consistence is firm or very firm.

Darien Series

The Darien series consists of very deep, somewhat poorly drained, nearly level to sloping soils, mainly on till plains and in some valleys. These soils formed in glacial till derived mainly from soft shale. Slopes range from 0 to 15 percent.

Darien soils are associated with Fremont, Busti, Volusia, Erie, and Orpark soils. They have a higher content of clay than Busti soils and are deeper over bedrock than Orpark soils. They have a layer of accumulated clay in the subsoil that is not present in Fremont and Volusia soils. They do not have the fragipan that is typical of Volusia and Erie soils.

Typical pedon of Darien silt loam, 3 to 8 percent slopes; in the town of Cherry Creek; ⅜ mile north of the intersection of Milestrip Road and County Route 83, 50 feet west of County Route 83:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; many fine roots; neutral; about 5 percent gravel; abrupt smooth boundary.

Eg—9 to 14 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; about 5 percent gravel; neutral; clear smooth boundary.

B/E—14 to 21 inches; brown (10YR 4/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; grayish brown (10YR 5/2) silty faces of peds that are 1 to 2 millimeters thick; weak medium subangular blocky structure; friable; few fine roots; about 10 percent gravel; neutral; clear wavy boundary.

Bt—21 to 31 inches; dark yellowish brown (10YR 4/4) gravelly silty clay loam; few fine distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) faces of peds; weak medium subangular blocky structure; firm; few distinct clay flows in pores and on faces of peds; few fine roots; about 15 percent gravel; neutral; clear wavy boundary.

C—31 to 72 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak thin platy

structure; firm; about 15 percent gravel; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 30 to 45 inches. The depth to bedrock is more than 60 inches. The depth to carbonates ranges from 25 to 48 inches. The content of rock fragments ranges, by volume, from 2 to 15 percent in the surface layer, from 2 to 35 percent in the subsurface layer and subsoil, and from 10 to 60 percent in the substratum. Reaction ranges from moderately acid to neutral in the surface layer, Eg horizon, and B/E horizon. It is slightly acid or neutral in the Bt horizon and mildly alkaline or moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction.

The E horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 or 3. The texture is silt loam, loam, or silty clay loam in the fine-earth fraction. This horizon has weak, angular, blocky or platy structure. Consistence is friable or firm.

The B/E horizon has colors and textures similar to those of the E and Bt horizons. Consistence is friable or firm.

The Bt horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam, clay loam, or silty clay loam. This horizon has common or many, medium or coarse, distinct mottles. Structure is weak or moderate, medium or coarse, subangular or angular blocky. Consistence is friable or firm.

The C horizon has colors and textures similar to those of the Bt horizon. It is massive or has platy structure.

Dunkirk Series

The Dunkirk series consists of very deep, well drained, moderately steep and steep soils on glacial lake plains. These soils formed in lake-laid sediment dominated by silt and clay. Slopes range from 15 to 45 percent.

Dunkirk soils are in a drainage sequence that includes the moderately well drained Collamer soils, the somewhat poorly drained Niagara soils, and the poorly drained and very poorly drained Canandaigua soils. They commonly are associated with Rhinebeck, Unadilla, Colonie, and Valois soils. They are better drained and contain less clay than Rhinebeck soils. They contain more clay than Unadilla soils and less sand than Colonie soils. They contain fewer rock fragments than Valois soils, which formed in glacial till.

Typical pedon of Dunkirk silt loam, 15 to 25 percent slopes; in the town of Pomfret; ½ mile north of Cassadaga and 600 feet west of New York Route 60, at the face of an excavation:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; moderate fine and medium granular structure; friable; many fine roots, moderately acid; abrupt smooth boundary.

E—6 to 12 inches; pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; common fine roots; moderately acid; clear smooth boundary.

BE—12 to 21 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common fine pores with thin clay coatings; pale brown (10YR 6/3) ped coatings 1 to 2 millimeters thick; slightly acid; clear wavy boundary.

Bt1—21 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; common medium pores with thick clay linings; few distinct clay films on faces of peds and in pores; slightly acid; clear wavy boundary.

Bt2—29 to 38 inches; brown (10YR 4/3) silty clay loam; moderate medium and coarse subangular blocky structure; firm; distinct clay linings in pores and on faces of peds; slightly acid; clear smooth boundary.

C1—38 to 45 inches; brown (10YR 4/2) silty clay loam; massive; firm; neutral; clear wavy boundary.

C2—45 to 72 inches; brown (10YR 4/2), varved layers of silt and clay; firm; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 20 to 45 inches. The depth to bedrock is more than 60 inches. The depth to carbonates is 20 to 50 inches. Rock fragments commonly are not present in the profile, but in some pedons they make up as much as 5 percent of the profile. Reaction ranges from strongly acid to neutral in the Ap and E horizons, from moderately acid to mildly alkaline in the subsoil, and from slightly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is silt loam, silty clay loam, or very fine sandy loam.

The E horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 2 to 4. The texture is silt loam or fine sandy loam. Structure is weak or moderate, fine or medium, subangular blocky. Consistence ranges from very friable to firm.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam, silty clay loam, or very fine sandy loam. Structure is weak to strong, medium or coarse, angular or subangular blocky. Consistence is friable or firm.

The C horizon has colors similar to those of the Bt

horizon. The texture is very fine sand, silt, or silty clay loam. This horizon is massive or varved. Consistence is friable or firm.

Elnora Series

The Elnora series consists of very deep, moderately well drained soils that formed in lake-laid or windblown deposits of fine sand. These soils are on remnant sandbars and beaches of glacial lake plains. Slopes range from 0 to 8 percent.

Elnora soils are in a drainage sequence that includes the well drained Colonie soils, the somewhat poorly drained Minoa soils, and the poorly drained Lamson soils. They are in landscape positions similar to those of Pompton, Scio, Niagara, and Collamer soils. They are coarser textured than Scio soils, contain less clay than Collamer and Niagara soils, and contain fewer rock fragments than Pompton soils.

Typical pedon of Elnora fine sandy loam, 0 to 3 percent slopes; in the town of Stockton; 30 feet north of County Route 35, ½ mile east of South Stockton:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

Bw1—9 to 22 inches; yellowish brown (10YR 5/4) loamy fine sand; very weak fine subangular blocky structure; very friable; common fine roots; many very dark grayish brown (10YR 3/2) organic stains in the upper 6 inches; moderately acid; abrupt smooth boundary.

Bw2—22 to 30 inches; brown (10YR 5/3) loamy fine sand; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; very weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary.

C1—30 to 38 inches; brown (10YR 4/3) loamy fine sand; single grained; loose; about 2 percent rock fragments; strongly acid; clear wavy boundary.

C2—38 to 72 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; about 2 percent rock fragments; strongly acid.

The depth to contrasting material is more than 72 inches. The content of rock fragments commonly ranges from 0 to 5 percent throughout the profile, but in some horizons it is as much as 15 percent. Reaction ranges from extremely acid to slightly acid in the surface layer and subsoil and from strongly acid to neutral in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is loamy fine sand, fine sandy loam, or very fine sandy loam.

The B horizon has hue of 5YR to 5Y, value of 4 to 6, and chroma of 3 to 6. The texture is loamy fine sand or fine sand. Structure is weak, fine, subangular blocky or platy.

The C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The texture is loamy fine sand or fine sand. This horizon is massive or single grained.

Erie Series

The Erie series consists of very deep, somewhat poorly drained, nearly level to sloping soils on till plains and on the upland plateau. These soils formed in glacial till derived mainly from siltstone or sandstone and from shale and limestone. Slopes range from 0 to 15 percent.

Erie soils are in a drainage sequence that includes the moderately well drained Langford soils. They are associated with Fremont, Darien, Busti, Ashville, and Mardin soils. They are less well drained than Mardin soils but are better drained than the poorly drained Ashville soils. They have a finer textured subsoil than Busti soils. Fremont, Darien, and Busti soils do not have a fragipan.

Typical pedon of Erie silt loam, 3 to 8 percent slopes; in the town of Westfield; ½ mile west of the intersection of County Route 83 and Coon Road, 25 yards north of Coon Road:

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine medium granular structure; friable; many fine roots; about 5 percent gravel; moderately acid; abrupt smooth boundary.

E—12 to 15 inches; pale brown (10YR 6/3) silt loam; common fine distinct strong brown (7.5YR 5/6) and few fine faint grayish brown (10YR 5/2) mottles; weak thin and very thin platy structure; friable; common fine and few medium roots; common fine and few medium tubular and vesicular pores; common skeletans and thin patchy clay films in pores; about 5 percent gravel; moderately acid; abrupt smooth boundary.

Bx—15 to 28 inches; yellowish brown (10YR 5/4) gravelly silt loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; grayish brown (2.5YR 5/2) prism faces ¼ to ½ inch thick; strong brown rind ⅛ inch thick adjacent to prism faces; very coarse prismatic structure parting to moderate fine medium subangular blocky; firm; slightly brittle; few fine roots; common pores; very few clay films in pores;

about 15 percent gravel; neutral; clear smooth boundary.

BC—28 to 35 inches; brown (10YR 5/3) gravelly loam; common fine faint yellowish brown (10YR 5/4) and few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm; common fine and medium vesicular and few fine and medium tubular pores; thin patchy clay films in pores; about 25 percent gravel; neutral; gradual irregular boundary.

Cd1—35 to 50 inches; brown (10YR 5/3) gravelly loam; common medium faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; common fine pores; very few faint clay films in pores; about 20 percent gravel; mildly alkaline; gradual smooth boundary.

Cd2—50 to 72 inches; brown (10YR 5/3) very gravelly silt loam; few fine faint brown (7.5YR 5/4) mottles; dark brown (7.5YR 4/4) lenses; massive; firm; about 35 percent gravel; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 32 to 58 inches. The depth to bedrock is 60 inches or more. The depth to carbonates ranges from 35 to 65 inches. Depth to the top of the fragipan ranges from 10 to 21 inches. The content of rock fragments consisting mainly of gravel ranges, by volume, from 5 to 35 percent above the fragipan and from 15 to 60 percent in the Bx, BC, and C horizons. Reaction ranges from strongly acid to slightly acid in the Ap and E horizons, from moderately acid to mildly alkaline in the Bx and BC horizons, and from slightly acid to moderately alkaline in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam or loam in the fine-earth fraction.

The E horizon has hue of 7.5YR to 5Y, value of 5 or 6, and chroma of 2 or 3. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. This horizon has subangular blocky or platy structure. Consistence is friable or firm.

The Bx horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It has few to many distinct mottles. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Consistence is firm or very firm, and the material is slightly brittle or brittle.

The BC horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. The textures are similar to those of the Bx horizon. Consistence is firm or very firm.

The Cd horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Structure is platy, or the material is massive. Consistence is firm or friable.

Fluvaquents

Fluvaquents are deep and very deep, somewhat poorly drained to very poorly drained soils that formed in recent alluvial deposits. These soils show little or no profile development. They are adjacent to secondary streams and are frequently flooded. Slopes range from 0 to 3 percent but are mainly less than 2 percent.

Fluvaquents are mapped with Udifluvents. They are near Middlebury, Holderton, Wakeland, Teel, and Wayland soils. They are in positions on the landscape where an adjacent stream frequently shifts the soil deposits from place to place by scouring, cutting, and lateral erosion.

Because of the variability of Fluvaquents, a typical pedon is not provided. The solum of these soils consists of an A horizon 1 inch to 5 inches thick. The depth to bedrock ranges from 40 to more than 60 inches. The content of rock fragments consisting of gravel, cobblestones, and flagstones ranges, by volume, from 0 to 70 percent. These soils are strongly acid to mildly alkaline. The content of organic matter decreases irregularly as depth increases.

The A horizon commonly has hue of 5YR to 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The texture is quite variable. It is loamy sand to silty clay loam or the gravelly or very gravelly analogs of the textures within that range. In some areas the surface is stony.

The C horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 5. It is loamy sand to silty clay or the gravelly, cobbly, or very gravelly analogs of the textures within that range. Some pedons are mottled. Consistence is friable to loose.

Fremont Series

The Fremont series consists of very deep, somewhat poorly drained, nearly level to moderately steep soils on uplands. These soils formed in glacial till derived from shale, siltstone, and sandstone. They are on broad hills on upland till plains. Slopes range from 0 to 25 percent.

Fremont soils are in a drainage sequence that includes the moderately well drained Schuyler soils. They are associated with Erie, Volusia, Hornell, Orpark, and Ashville soils. They do not have the fragipan that is typical of Erie and Volusia soils. They are better drained than Ashville soils and contain less clay than Hornell soils. They do not have bedrock within a depth of 40 inches, which is typical of Hornell and Orpark soils.

Typical pedon of Fremont silt loam, 3 to 8 percent slopes; in the town of Carroll; ¼ mile south of the intersection of Bain Road and Austin Road, 70 feet west of Bain Road:

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; friable; many fine and medium roots; about 10 percent channery fragments; moderately acid; clear smooth boundary.

Bw1—8 to 19 inches; yellowish brown (10YR 5/4) channery silt loam; common fine distinct strong brown (7.5YR 5/6) and few fine distinct pinkish gray (5YR 6/2) mottles in the lower 5 inches; moderate fine and medium subangular blocky structure; friable; many fine roots in the upper part of the horizon grading to common fine roots in the lower part; many fine vesicular pores and few fine and medium tubular pores; about 30 percent channery fragments, 5 percent of which is more than 3 inches in diameter; moderately acid; clear wavy boundary.

Bw2—19 to 35 inches; dark yellowish brown (10YR 4/4) channery silty clay loam; gray (5Y 6/1) faces of peds; common medium distinct strong brown (7.5YR 5/8) and gray (7.5YR 6/0) mottles; moderate medium subangular blocky structure; firm; few fine roots; many fine vesicular and tubular pores; very few faint patchy clay films and faint silt films on faces of peds and few faint clay films in pores; about 20 percent channery fragments; strongly acid; gradual wavy boundary.

C—35 to 72 inches; dark brown (10YR 4/3) channery silty clay loam; common fine and medium distinct gray (5YR 6/1) and strong brown (7.5YR 5/8) mottles; massive, but a few prism streaks fade into the upper part of horizon; firm; common fine vesicular and very few fine tubular pores; faint clay films in tubular pores; about 25 percent channery fragments; strongly acid.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 10 to 35 percent in the solum and from 20 to 60 percent in the substratum. Reaction ranges from very strongly acid to moderately acid in the solum and substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam or silty clay loam in the fine-earth fraction.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam or silty clay loam in the fine-earth fraction. This horizon has common or many, medium, distinct mottles. Structure is weak or moderate, fine to strong, subangular blocky. Consistence is friable or firm.

The C horizon has colors and textures similar to those of the B horizon.

Frewsburg Series

The Frewsburg series consists of moderately deep, somewhat poorly drained, gently sloping and sloping soils that formed in residuum of interbedded shale, siltstone, and sandstone. Bedrock is at a depth of 20 to 40 inches. These soils are on hilltops and side slopes in areas where the topography is influenced by the underlying bedrock. Slopes range from 3 to 15 percent.

Frewsburg soils are in a drainage sequence that includes the well drained Carrollton soils and are associated with Ivory, Kinzua, and Onoville soils. They are wetter and shallower over bedrock than Kinzua and Onoville soils, and they contain less clay than Ivory soils.

Typical pedon of Frewsburg silt loam, 3 to 8 percent slopes; in the town of Carroll; 500 feet west of the intersection of Oak Hill Road and County Route 336, 20 feet north of County Route 336:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; very friable; many medium and fine roots; about 10 percent channery fragments; very strongly acid; clear smooth boundary.

BE1—7 to 13 inches; brownish yellow (10YR 6/6) silt loam; common fine faint strong brown (7.5YR 5/6) and few faint light yellowish brown (2.5Y 6/4) mottles; weak fine and medium subangular blocky structure; very friable; many fine and few medium roots; many fine vesicular pores and few fine and medium tubular pores; about 10 percent channery fragments; very strongly acid; clear smooth boundary.

BE2—13 to 17 inches; strong brown (7.5YR 5/6) channery silt loam; light brownish gray (2.5Y 6/2) faces of peds; common medium faint yellowish red (5YR 5/6) and yellowish brown (10YR 5/6) mottles; strong fine and medium angular blocky structure; friable; common fine roots; common fine and medium vesicular and tubular pores; silt coatings in pores; about 15 percent channery fragments; very strongly acid; clear wavy boundary.

Bt—17 to 25 inches; brown (10YR 4/3) channery clay loam; light gray (5Y 7/1) faces of peds; many fine and medium faint strong brown (7.5YR 5/8) and dark brown (7.5YR 4/4) mottles and common fine and medium light olive gray (5Y 6/2) mottles; moderate very coarse prismatic structure (prisms are 6 to 16 inches across) parting to weak coarse subangular blocky; firm; few fine roots along prism faces; common fine vesicular and few fine tubular

pores; thin clay linings on all tubular pores; few distinct clay films on faces of peds; about 15 percent channery fragments; very strongly acid; clear wavy boundary.

BC—25 to 38 inches; olive (5Y 5/3) channery silty clay loam; olive gray (5Y 5/2) ped coatings; few medium distinct strong brown (7.5YR 5/6) and common fine distinct gray (10YR 6/1) mottles; weak fine and medium subangular blocky structure; firm; common fine pores; common faint clay films; about 15 percent channery fragments; very strongly acid; abrupt smooth boundary.

R—38 inches; olive gray (5Y 4/2) siltstone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments consisting mainly of shale and siltstone ranges, by volume, from 5 to 35 percent in the solum and from 15 to 50 percent in the substratum. Reaction is very strongly acid or strongly acid throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 to 4. The texture is silt loam or loam in the fine-earth fraction.

The BE horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silt loam, loam, or silty clay loam. Structure is fine or medium, angular or subangular blocky. Consistence is friable or firm.

The Bt horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 8. The texture is silt loam, loam, silty clay loam, or clay loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, angular or subangular blocky or prismatic. Consistence is friable or firm.

The BC horizon has colors and textures similar to those of the Bt horizon.

The C horizon, if it occurs, has colors and textures similar to those of the BC horizon. Consistence is friable or firm. This horizon is massive or has weak, platy structure.

Getzville Series

The Getzville series consists of very deep, nearly level, poorly drained and very poorly drained soils on glacial lake plains. These soils formed in glacial lake-laid sediment and old alluvial deposits of silt or very fine sand underlain by water-sorted deposits of sand or gravel at a depth of 20 to 40 inches. They are on broad valley flats once dominated by former glacial lakes. Slopes are less than 2 percent.

Getzville soils are in a drainage sequence that includes the somewhat poorly drained Swormville soils. They are associated with Raynham, Minoa, Canadice, Canandaigua, and Lamson soils. They are less well drained than Minoa soils, and they do not have the deep, sandy deposits typical of Minoa soils. They have a higher content of clay in the subsoil than Raynham soils and have more sand in the substratum than Canandaigua soils. They have less clay in the subsoil than Canadice soils and do not have the sand content in the subsoil that is typical of Lamson soils.

Typical pedon of Getzville silt loam; in the town of Villenova; 1½ miles north of the intersection of Kent Switch Road and Mile Strip Road, 30 yards east of Mile Strip Road:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bg1—10 to 19 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; slightly acid; clear wavy boundary.

Bg2—19 to 22 inches; grayish brown (10YR 5/2) silt loam; many (45 percent of horizon) medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; slightly acid; abrupt wavy boundary.

2C1—22 to 30 inches; grayish brown (10YR 5/2) loamy sand; single grained; loose; neutral; clear wavy boundary.

2C2—30 to 72 inches; grayish brown (10YR 5/2), stratified sand; single grained; loose; about 10 percent coarse fragments; neutral.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. Depth to the underlying sandy material ranges from 15 to 36 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent in the surface layer and subsoil. In some pedons it ranges from 0 to 40 percent in the substratum. Reaction is strongly acid to neutral in the surface layer, moderately acid to neutral in the subsoil, and neutral or mildly alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3. The texture is silt loam or silty clay loam.

The Bg horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 2 or less. It has common or many, distinct, high-chroma mottles. The texture is silt loam or silty clay loam. Consistence is friable or firm. Structure is weak or moderate, medium or coarse, prismatic parting to moderate or strong, medium or coarse, subangular blocky.

The 2C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The texture ranges from sand to loamy sand in the fine-earth fraction.

Halsey Series

The Halsey series consists of very deep, very poorly drained, nearly level soils on outwash plains and valley terraces. These soils formed in water-sorted, gravelly and sandy material derived from shale, sandstone, and siltstone. Slopes range from 0 to 3 percent.

Halsey soils are in a drainage sequence that includes the well drained Chenango soils, the moderately well drained Pompton soils, and the somewhat poorly drained Red Hook soils. They are in landscape positions similar to those of Alden, Canandaigua, and Wayland soils. They have less clay and a higher rock fragment content throughout than Alden or Canandaigua soils. They do not have the high silt content that is typical of Wayland soils.

Typical pedon of Halsey mucky silt loam; in the town of Stockton; ¾ mile east of South Stockton and County Route 35, in a road ditch on the south side of County Route 35:

Ap—0 to 9 inches; very dark gray (10YR 3/1) mucky silt loam, gray (10YR 5/1) dry; weak medium and fine granular structure; friable; many fine roots; about 5 percent gravel; moderately acid; abrupt smooth boundary.

Eg—9 to 16 inches; gray (10YR 6/1) loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; about 10 percent gravel; slightly acid; clear wavy boundary.

Bg1—16 to 21 inches; gray (10YR 6/1) loam; many medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; about 10 percent gravel; neutral; clear wavy boundary.

Bg2—21 to 26 inches; gray (2.5Y 5/1) loam; common medium distinct strong brown (7.5YR 5/6) and common fine faint gray (10YR 6/1) mottles; weak medium platy structure; friable; about 5 percent gravel; neutral; abrupt wavy boundary.

2C1—26 to 45 inches; grayish brown (10YR 5/2) gravelly loamy sand; single grained; loose; about 20 percent gravel; neutral; abrupt wavy boundary.

3C2—45 to 72 inches; grayish brown (10YR 5/2) loamy sand; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; single grained; loose; about 10 percent gravel; moderately alkaline; slightly effervescent.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 30 percent in the solum and from 10 to 60 percent in the substratum. Reaction ranges from moderately acid to neutral in the solum and from slightly acid to moderately alkaline in the substratum. The depth to carbonates ranges from 30 to 60 inches.

The Ap horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The texture is fine sandy loam, silt loam, or loam or the mucky analogs of these textures.

The E horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 5 or 6 and chroma of 0 or 1. Structure is platy or subangular blocky. The texture is very fine and fine sandy loam, loam, or silt loam in the fine-earth fraction.

The Bg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 2 or less. The texture is loam, silt loam, or fine sandy loam in the fine-earth fraction. Structure is weak or moderate, medium, platy or subangular blocky. Consistence is friable or firm. This horizon has common or many, medium or coarse, distinct mottles.

The 2C and 3C horizons have hue of 10YR to 5Y or are neutral in hue. They have value of 3 to 6 and chroma of 2 or less. The texture is mainly loamy sand or sand or consists of stratified, loose or firmly packed gravel and sand.

Hamlin Series

The Hamlin series consists of very deep, well drained, nearly level soils in the highest positions on flood plains. These soils formed in recent alluvial deposits. Slopes range from 0 to 3 percent.

Hamlin soils are in a drainage sequence that includes the moderately well drained Teel soils, the somewhat poorly drained Wakeland soils, and the poorly drained and very poorly drained Wayland soils. They are associated with Chenango, Scio, and Allard soils. They formed in recent alluvial deposits, and Scio and Allard soils formed in silty lacustrine sediment. Hamlin soils do not have the contrasting gravelly underlying deposits that are typical of Allard soils, and they do not have the gravel content throughout that is typical of Chenango soils.

Typical pedon of Hamlin silt loam; in the town of Villenova; 100 yards west of the intersection of New York Route 322 and County Route 30, 100 yards south of New York Route 322:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine roots; neutral; abrupt wavy boundary.

Bw1—8 to 31 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; common fine roots; less than 2 percent gravel; neutral; clear wavy boundary.

Bw2—31 to 38 inches; brown (10YR 4/3) very fine sandy loam; weak medium subangular blocky structure; friable; few fine roots; neutral; clear wavy boundary.

2C—38 to 72 inches; grayish brown (10YR 5/2) and dark brown (7.5YR 4/4) fine sandy loam; massive; friable; neutral.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The depth to carbonates or to contrasting material is more than 40 inches. The content of rock fragments commonly is less than 5 percent throughout the profile. Reaction ranges from strongly acid to neutral in the upper 20 inches and from moderately acid to mildly alkaline below this depth.

The Ap horizon has hue of 5YR to 10YR, value of 3 or 4, and chroma of 1 to 3. The texture is silt loam or very fine sandy loam.

The B horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam or very fine sandy loam. Structure is weak or moderate, fine or medium, granular, subangular blocky, or prismatic. Consistence is very friable or friable.

The C horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam or fine sandy loam. This horizon is massive or has platy structure.

Henrietta Series

The Henrietta series consists of very deep, very poorly drained soils on lake plains and deltas. These soils formed in shallow organic deposits less than 16 inches thick over sandy glacial lake sediment. Slopes range from 0 to 3 percent.

Henrietta, Lamson, and Canandaigua soils occupy similar positions on the landscape. Lamson soils do not have a shallow surface layer of muck. Henrietta soils do not have the content of fine silt and clay that is typical of Canandaigua soils.

Typical pedon of Henrietta muck; in the town of Cherry Creek; ½ mile west of the intersection of Dredge Road and County Route 313, ½ mile north of County Route 313:

Oap—0 to 8 inches; sapric material that is black (10YR 2/1), broken face; about 5 percent fiber, less than 5 percent rubbed; moderate medium granular structure; friable; many roots; neutral (limed); clear smooth boundary.

Oa—8 to 12 inches; sapric material that is very dark gray (10YR 3/1), broken face; about 5 percent fiber, less than 5 percent rubbed; weak fine and medium subangular blocky structure; friable; common roots; neutral (limed); abrupt smooth boundary.

2Bg1—12 to 22 inches; gray (10YR 5/1) silt loam that has thin lenses of fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; weak fine subangular blocky structure; friable; moderately acid; clear wavy boundary.

2Bg2—22 to 35 inches; gray (10YR 5/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 5/1) mottles; weak fine and medium subangular blocky structure; loose; slightly acid; abrupt wavy boundary.

2Cg1—35 to 65 inches; gray (10YR 5/1) loamy fine sand; single grained; loose; neutral; abrupt wavy boundary.

3Cg2—65 to 72 inches; gray (10YR 5/1), stratified fine and medium sand; single grained; loose; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches. The content of coarse fragments ranges from 0 to 15 percent in the mineral horizon. Reaction ranges from moderately acid to mildly alkaline in the solum.

The Oap and Oa horizons have hue of 10YR or 7.5YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 3. Structure is weak or moderate, granular or subangular blocky. Fiber content is less than 15 percent when rubbed.

The 2Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. The texture is silt loam, fine sandy loam, or sandy loam and includes strata of loamy sand to sand. Structure is weak or moderate, subangular blocky.

The 2Cg and 3Cg horizons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. They are stratified silt loam, loam, sandy loam, fine sandy loam, loamy fine sand, loamy sand, and sand. They contain free carbonates in most pedons.

Hinesburg Series

The Hinesburg series consists of very deep, well drained, nearly level to sloping soils on former lake plains and deltas. These soils formed in sandy windblown material that is underlain by silty lacustrine deposits. Slopes range from 0 to 15 percent.

Hinesburg soils are associated with Allard, Scio, Elnora, Chenango, and Collamer soils. They do not have the silty mantle that is typical of Allard soils. They have less clay in the subsoil than is typical of Collamer

soils, and they do not have the gravel content that is associated with Chenango soils. They are better drained than the silty Scio soils and the sandy Elnora soils.

Typical pedon of Hinesburg fine sandy loam, 3 to 8 percent slopes; in the town of Poland; ⅜ mile south of the intersection of New York Route 394 and Stone Road, 50 feet west of Stone Road:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium and fine granular structure; friable; many fine roots; neutral (limed); abrupt smooth boundary.

Bw1—9 to 23 inches; yellowish brown (10YR 5/6) loamy fine sand; single grained; very friable; many fine roots; moderately acid; clear wavy boundary.

Bw2—23 to 32 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; very friable; few fine roots; moderately acid; clear wavy boundary.

2C1—32 to 55 inches; pale brown (10YR 6/3) silt loam; 4-inch-wide tongues; 50 percent grayish brown (10YR 5/2) and 50 percent strong brown (7.5YR 5/6) material between tongues; weak platy structure; friable; moderately acid; clear wavy boundary.

2C2—55 to 72 inches; pale brown (10YR 6/3) silt loam; common medium distinct grayish brown (10YR 5/2) and strong brown (7.5YR 5/6) mottles; weak platy structure; friable; moderately acid.

The thickness of the solum ranges from 16 to 32 inches. The depth to bedrock is more than 60 inches. Rock fragments commonly are not present in the profile, but in some pedons they make up as much as 10 percent of the profile. In areas that have not been limed, reaction is moderately acid or slightly acid in the solum and ranges from strongly acid to neutral in the 2C horizon.

The Ap horizon has hue of 7.5YR to 2.5Y and value and chroma of 2 to 4. The texture is loamy sand or fine sandy loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is sand, loamy sand, or loamy fine sand. This horizon is massive or single grained. Consistence is loose or very friable.

The 2C horizon has hue of 7.5YR to 5Y, value of 3 to 7, and chroma of 1 to 4. The texture is very fine sandy loam, silt loam, or silty clay loam. Consistence is friable or firm.

Holderton Series

The Holderton series consists of very deep, somewhat poorly drained, nearly level soils on flood plains. These soils formed in postglacial alluvium derived mainly from shale and sandstone. Slopes range from 0 to 3 percent.

Holderton soils are in a drainage sequence that includes the well drained Tioga soils, the moderately well drained Middlebury soils, and the poorly drained and very poorly drained Wayland soils. They are associated with Hamlin, Teel, and Wakeville soils. They have a higher sand content than Wakeville soils and are less well drained than Hamlin and Teel soils.

Typical pedon of Holderton silt loam; in the town of Harmony; ½ mile south of the intersection of Baker Street and Hoag Road, 1,200 feet west of Hoag Road:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

Bw1—10 to 14 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

Bw2—14 to 29 inches; gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark gray (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few fine roots; slightly acid; clear wavy boundary.

BC—29 to 38 inches; dark gray (10YR 4/1) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and brown (7.5YR 5/4) mottles; weak medium platy structure; friable; slightly acid; clear wavy boundary.

2C—38 to 72 inches; dark gray (10YR 4/1) fine sandy loam; massive; friable; neutral.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is 60 inches or more. The content of rock fragments consisting mainly of gravel ranges, by volume, from 0 to 10 percent in the surface layer and subsoil and from 0 to 25 percent in the substratum. Reaction ranges from moderately acid to neutral throughout the profile.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 or 3. The texture is silt loam or loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 1 to 6. The texture is silt loam, loam, sandy loam, or fine sandy loam.

The BC horizon has colors and textures similar to those of the B horizon.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 6. The texture is sandy clay loam, fine sandy loam, sandy loam, loamy sand, loam, or loamy fine sand or the gravelly analogs of those textures.

Hornell Series

The Hornell series consists of moderately deep, somewhat poorly drained, nearly level to moderately steep soils on bedrock-controlled till plains on the upland plateau. Bedrock is at a depth of 20 to 40 inches. These soils formed in acid, clayey glacial till derived from soft shale. Slopes range from 0 to 25 percent.

Hornell soils are associated with Fremont, Schuyler, Towerville, Orpark, Mardin, and Volusia soils. They have a higher content of clay than Fremont and Orpark soils and are wetter than Schuyler and Towerville soils. They do not have the fragipan that is typical of Mardin and Volusia soils and are finer textured.

Typical pedon of Hornell silt loam, 3 to 8 percent slopes; in the town of Sheridan; 800 feet east of the intersection of Mezzio Road and Center Road, in a ditch along Mezzio Road:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; common fine roots; about 5 percent channery fragments; strongly acid; abrupt smooth boundary.

Bw1—8 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; common medium faint yellowish brown (10YR 5/6) and many medium prominent light brownish gray (2.5Y 6/2) mottles; moderate medium and coarse angular blocky structure; firm; common fine roots; common fine pores; gray or light gray (5Y 6/1) faces of peds; about 5 percent channery fragments; very strongly acid; clear smooth boundary.

Bw2—15 to 31 inches; strong brown (7.5YR 5/6) silty clay loam; common medium prominent light olive gray (5Y 6/2) mottles in peds; moderate coarse prismatic structure parting to moderate medium angular blocky; firm; few fine roots; few fine pores; light olive gray (5Y 6/2) faces of peds; silt films on faces of some peds; about 5 percent channery fragments; very strongly acid; gradual smooth boundary.

Bw3—31 to 35 inches; strong brown (7.5YR 5/6) silty clay; common medium prominent light olive gray (5Y 6/2) mottles in peds; moderate coarse angular blocky structure; firm; light olive gray (5Y 6/2) faces of peds; about 10 percent channery fragments; very strongly acid; abrupt smooth boundary.

2Cr—35 to 38 inches; olive gray (5Y 5/2) channery silty clay; moderate thin and medium platy structure inherited from weathered shale bedrock; firm; common prominent strong brown (7.5YR 5/6) stains; about 30 percent rock fragments, mainly soft disintegrating shale; very strongly acid; clear wavy boundary.

2R—38 inches; horizontal, thinly bedded, gray (5Y 5/1), soft shale interbedded with siltstone; strongly acid.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments consisting mainly of weathered shale but including siltstone ranges, by volume, from 0 to 5 percent in the surface layer, from 5 to 35 percent in the subsoil, and from 15 to 60 percent in the substratum. Reaction is strongly acid or very strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 2 to 4, and chroma of 1 to 4. The texture is silt loam or silty clay loam.

The Bw horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 3 to 8. The texture is silty clay loam, silty clay, or clay in the fine-earth fraction. Structure is moderate or strong, medium or coarse, subangular or angular blocky. Consistence is firm or very firm.

The C horizon, if it occurs, has colors and textures similar to those of the Bw horizon. It is massive or has platy structure inherited from the rock structure.

Ivory Series

The Ivory series consists of very deep, somewhat poorly drained, gently sloping and sloping soils that formed in weathered residuum of interbedded shale, siltstone, and fine grained sandstone. These soils are on the crests of plateaus and on the summits of uplands. Slopes range from 3 to 8 percent.

Ivory soils are associated with Carrollton and Frewsburg soils but are deeper over bedrock and have more clay in the subsoil. They also are associated with Kinzua and Onoville soils but are finer textured and wetter.

Typical pedon of Ivory silty clay loam, 3 to 8 percent slopes; in the town of Carroll; 900 feet east of the intersection of Oak Hill Road and a dead end road; 20 feet south of the dead end road and 1,200 feet west of the Cattaraugus County line:

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and coarse granular structure; friable; common fine and medium roots; about 5 percent channery fragments; very strongly acid; clear smooth boundary.

BE—5 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; few medium distinct very pale brown (10YR 7/3) and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable; few medium and fine roots; few fine pores;

about 10 percent channery fragments; very strongly acid; clear smooth boundary.

BEg—12 to 15 inches; gray (5Y 6/1) silty clay loam; light gray (5Y 7/1) faces of peds; many medium prominent strong brown (7.5YR 5/6) mottles; strong coarse angular blocky structure; friable; few fine and medium roots; few fine and medium pores; about 10 percent channery fragments; very strongly acid; clear wavy boundary.

Bt—15 to 35 inches; yellowish brown (10YR 5/4) channery silty clay; light gray (5Y 7/1) faces of peds; common medium prominent light gray (5Y 7/1) and common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium and thick platy; firm; few medium and fine roots; few fine tubular and vesicular pores; common distinct silt and clay films lining pores and on faces of peds; about 30 percent channery fragments; very strongly acid; clear wavy boundary.

C—35 to 52 inches; variegated dark brown (10YR 4/3), dark reddish brown (5YR 3/4), strong brown (7.5YR 5/6), and gray (5Y 6/1) very channery silty clay loam; weak medium and thin platy structure; firm; common fine vesicular and few fine and medium tubular pores; about 50 percent channery fragments that include numerous partially weathered soft shale fragments; strongly acid; clear smooth boundary.

Cr—52 to 72 inches; variegated light olive brown (2.5Y 5/4), strong brown (7.5YR 5/6), and light greenish gray (5GY 7/1) very channery silty clay loam; many olive brown (2.5Y 4/4) disintegrated shale fragments; weak thin and medium platy structure inherited from rock structure; firm; few fine tubular and vesicular pores; about 45 percent channery fragments; very strongly acid; abrupt smooth boundary.

R—72 inches; very dark grayish brown (2.5Y 3/2) siltstone.

The thickness of the solum ranges from 20 to 50 inches. The depth to rippable bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 30 percent in the surface layer and subsoil and from 15 to 60 percent in the substratum. Reaction ranges from very strongly acid to moderately acid throughout the profile.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or silty clay loam in the fine-earth fraction.

The BE and BEg horizons have hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6. The texture is silty clay, silty clay loam, or clay in the fine-earth fraction.

The Bt horizon has hue of 7.5YR to 5Y, value of 4 to 7, and chroma of 1 to 6. It has distinct or prominent, high- and low-chroma mottles. The texture is silty clay loam, silty clay, or clay in the fine-earth fraction. Structure is prismatic or is weak to strong, angular or subangular blocky. Consistence is friable or firm.

The C horizon has hue of 5YR to 5Y or 5GY, value of 3 to 7, and chroma of 1 to 6. It has textures similar to those of the B horizon. It has prismatic or platy structure, or it is massive.

The Cr horizon has colors and textures similar to those of the C horizon, but it has a higher content of rock fragments and has inherited rock structure.

Kinzua Series

The Kinzua series consists of very deep, well drained, moderately steep and steep soils that formed in residuum of interbedded shale, siltstone, and some fine grained sandstone. Slopes range from 25 to 45 percent.

Kinzua soils are associated with Frewsburg, Ivory, Carrollton, Schuyler, and Onoville soils. They are deeper over bedrock than Carrollton and Frewsburg soils and are better drained than Ivory and Onoville soils. They also are better drained than Schuyler soils and are at higher elevations.

Typical pedon of Kinzua channery silt loam, 25 to 45 percent slopes; in the town of Carroll; 1 mile south of the intersection of Wheeler Hill Road and Gurnsey Hollow Road, 20 feet northwest of Gurnsey Hollow Road:

A—0 to 3 inches; dark grayish brown (10YR 4/2) channery silt loam; moderate medium and fine granular structure; friable; common fine roots; about 15 percent channery fragments; strongly acid; clear smooth boundary.

BE—3 to 11 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; common fine roots; about 25 percent channery fragments; strongly acid; clear wavy boundary.

Bt—11 to 34 inches; yellowish brown (10YR 5/4) channery silt loam; moderate fine subangular blocky structure; friable; common faint clay films on faces of peds and lining pores; common fine roots; about 30 percent channery fragments; strongly acid; clear wavy boundary.

BC—34 to 42 inches; brown (10YR 5/3) channery silt loam; weak medium subangular blocky structure; firm; about 30 percent channery fragments; strongly acid; clear wavy boundary.

C—42 to 72 inches; brown (10YR 5/3) channery silt

loam; weak thin platy structure; firm; about 30 percent channery fragments; strongly acid.

The thickness of the solum ranges from 34 to 60 inches. The depth to bedrock, typically rippable shale and siltstone, is more than 60 inches, but it commonly is less than 100 inches. The content of rock fragments consisting mainly of channery fragments and flagstones ranges, by volume, from 5 to 35 percent in the solum and from 10 to 60 percent in the substratum. Reaction is very strongly acid or strongly acid throughout the profile.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction.

The BE horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. The texture is loam or silt loam in the fine-earth fraction. Consistence is friable or very friable.

The Bt horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 3 to 8. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Some pedons have both low- and high-chroma mottles in the lower part of the B horizon but not within the upper 10 inches of the Bt horizon. Structure is subangular or angular blocky. Consistence is friable or firm.

The BC horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 3 to 6. The textures are similar to those of the C horizon. Structure is subangular blocky or platy. Consistence ranges from friable to very firm.

The Cd horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 3 to 6. The texture is silt loam, loam, silty clay loam, or clay loam in the fine-earth fraction. This horizon has prismatic or platy structure.

Lamson Series

The Lamson series consists of very deep, poorly drained, nearly level soils in slightly depressional areas of former glacial lake plains and deltas. These soils formed in lake-laid deposits dominated by very fine sand. Slopes range from 0 to 3 percent.

Lamson soils are in a drainage sequence that includes the well drained Colonie soils, the moderately well drained Elnora soils, and the somewhat poorly drained Minoa soils. They are associated with Getzville, Raynham, Canandaigua, and Halsey soils. They are more sandy than the silty Canandaigua soils and are wetter and contain more sand than Raynham soils. They do not have the finer textured silty mantle that is typical of Getzville soils, and they do not have the gravel content that is characteristic of Halsey soils.

Typical pedon of Lamson silt loam; in the town of Ellington; 1¾ mile south of the intersection of Dredge Ditch Road and County Route 313, 800 feet west of Dredge Ditch Road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; about 2 percent gravel; slightly acid; clear smooth boundary.

Eg—8 to 12 inches; gray (10YR 5/1) very fine sandy loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bg1—12 to 22 inches; brown (10YR 5/3) very fine sandy loam; many common distinct gray (10YR 6/1), strong brown (7.5YR 5/8), and reddish brown (5YR 5/4) mottles; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.

Bg2—22 to 37 inches; grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) fine sandy loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.

Cg—37 to 72 inches; dark grayish brown (10YR 4/2) fine sandy loam and fine sand; friable; massive; neutral, mildly alkaline at a depth of 55 inches; slightly effervescent.

The thickness of the solum ranges from 30 to 50 inches. The depth to bedrock or to contrasting material is more than 60 inches. Reaction ranges from moderately acid to mildly alkaline in the surface layer and subsurface layer and from slightly acid to moderately alkaline in the subsoil and substratum. The depth to carbonates ranges from 24 to 60 inches.

The Ap horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. The texture is fine sandy loam, loamy very fine sandy loam, very fine sandy loam, loam, or silt loam.

The Eg horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 1 to 3. The texture ranges from very fine sandy loam to loamy fine sand.

The Bg horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4. The texture is very fine sandy loam or fine sandy loam. Structure is weak, subangular blocky or granular, or the material is massive. Consistence is friable or very friable.

The Cg horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 4. The texture of the thin layers of varved material ranges from fine sand to silt. This horizon is single grained or massive. Consistence is firm or friable.

Langford Series

The Langford series consists of very deep, moderately well drained, gently sloping to moderately steep soils on glaciated uplands. These soils formed in glacial till derived mainly from siltstone, sandstone, shale, and some limestone. They have a fragipan starting at a depth of 15 to 28 inches. Slopes range from 3 to 25 percent.

Langford soils are in a drainage sequence that includes the somewhat poorly drained Erie soils. They are associated with Mardin, Schuyler, Ashville, and Chautauqua soils. They have a clay accumulation in the subsoil that is not present in Mardin soils, and they commonly are less acid than Mardin soils. They have a fragipan that is not present in Schuyler and Chautauqua soils, and they have more clay in the subsoil than Chautauqua soils. They are better drained than Ashville soils, and they have a fragipan that is not present in Ashville soils.

Typical pedon of Langford silt loam, 3 to 8 percent slopes; in the town of Ripley; 0.7 mile east of Sinder Road and 150 feet south of Sulphur Springs Road:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; friable; many fine roots; about 10 percent gravel; very strongly acid; abrupt smooth boundary.

Bw1—9 to 15 inches; yellowish brown (10YR 5/4) silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; common fine pores; about 10 percent gravel; strongly acid; clear wavy boundary.

Bw2—15 to 21 inches; yellowish brown (10YR 5/4) silt loam; many medium and coarse faint pale brown (10YR 6/3) and few fine distinct reddish brown (5YR 4/4) mottles; weak medium and coarse subangular blocky structure; friable; few fine roots; about 10 percent gravel; common fine pores; strongly acid; clear wavy boundary.

Bx1—21 to 34 inches; brown (10YR 4/3) gravelly silt loam; few medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to weak medium and coarse subangular blocky; firm, slightly brittle; few fine roots along prism faces; about 15 percent gravel; common fine vesicular and few fine tubular pores; few faint patchy clay films lining pores; prism faces 1/8 to 1/4 inch thick are light brownish gray (2.5Y 6/2) and have yellowish red (5YR 4/6) rinds; moderately acid; clear wavy boundary.

Bx2—34 to 45 inches; brown (10YR 4/3) gravelly silt loam; few medium distinct light brownish gray (2.5Y 6/2) and common fine faint brown (7.5YR 5/4) mottles; massive; firm, slightly brittle; few fine roots along prism faces; about 15 percent gravel; common fine and medium pores; common faint patchy clay films lining pores; neutral; clear wavy boundary.

Cd—45 to 72 inches; brown (10YR 4/3) gravelly silt loam; massive; firm; few fine roots; about 20 percent gravel; strongly effervescent; moderately alkaline.

The thickness of the solum ranges from 34 to 60 inches. The depth to carbonates is 36 to 65 inches. Depth to the top of the fragipan ranges from 15 to 28 inches. The depth to bedrock is more than 60 inches. The content of rock fragments consisting mainly of gravel, channery fragments, and flagstones ranges, by volume, from 5 to 35 percent above the fragipan. It commonly ranges from 15 to 60 percent in the fragipan and substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is fine sandy loam, loam, or silt loam in the fine-earth fraction. In areas that have not been limed, reaction ranges from very strongly acid to slightly acid.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Structure is very weak to moderate, subangular blocky, platy, or granular. Consistence is friable or very friable. Reaction ranges from strongly acid to neutral.

The Bx horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Structure is very coarse and prismatic, commonly parting to subangular blocky, or the material is massive. Consistence is firm or very firm, and the material is slightly brittle or brittle. Reaction ranges from strongly acid to mildly alkaline, but it is neutral to a depth of 40 inches.

The Cd horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. This horizon is massive or has platy structure. Consistence is firm or very firm. Reaction ranges from neutral to moderately alkaline.

Manlius Series

The Manlius series consists of moderately deep, well drained to excessively drained, steep and very steep soils on till plains in areas where the topography is influenced by the underlying bedrock. Bedrock is at a

depth of 20 to 40 inches. These soils formed in glacial till derived mainly from acid shale. Slopes range from 35 to 70 percent.

Manlius soils are associated with Towerville, Schuyler, Hornell, Orpark, and Chadakoin soils. They are better drained and contain less clay than Hornell, Orpark, Towerville, and Schuyler soils. They are not so deep as Chadakoin soils.

Typical pedon of a Manlius channery silt loam, in an area of Rock outcrop-Manlius complex, 35 to 70 percent slopes; in the town of Hanover; south of Interstate 90; ½ mile west of the intersection of County Route 90 and County Route 123, 40 feet south of County Route 90:

A—0 to 3 inches; dark grayish brown (10YR 4/2) channery silt loam; weak fine granular structure; friable; about 20 percent rock fragments; many fine roots; very strongly acid; clear smooth boundary.

Bw1—3 to 7 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine subangular blocky structure; friable; about 25 percent rock fragments; common fine roots; very strongly acid; clear smooth boundary.

Bw2—7 to 12 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable; about 30 percent rock fragments; common fine roots; very strongly acid; clear wavy boundary.

Bw3—12 to 21 inches; strong yellowish brown (7.5YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable; about 45 percent rock fragments; few fine roots; very strongly acid; abrupt smooth boundary.

C—21 to 25 inches; yellowish brown (10YR 5/4) very channery silt loam; massive; friable; about 60 percent rock fragments; strongly acid; abrupt smooth boundary.

R—25 inches; shale.

The thickness of the solum ranges from 15 to 30 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments consisting mainly of shale and some siltstone ranges, by volume, from 15 to 35 percent in the surface layer and from 25 to 60 percent in the subsoil and substratum. Reaction ranges from extremely acid to strongly acid in the surface layer and subsoil and from very strongly acid to slightly acid in the substratum.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is loam or silt loam in the fine-earth fraction.

The Bw horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 3 to 6. The texture is loam or silt loam in the fine-earth fraction. Structure is weak, fine or medium, angular or subangular blocky. Consistence is friable or firm.

The C horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 2 to 4. The texture is loam or silt loam in the fine-earth fraction. Consistence ranges from loose to firm.

Mardin Series

The Mardin series consists of very deep, moderately well drained, gently sloping to moderately steep soils on upland plateaus. These soils formed in firm glacial till derived from siltstone, sandstone, and brittle shale. Slopes range from 3 to 25 percent.

Mardin soils are in a drainage sequence that includes the somewhat poorly drained Volusia soils. They are associated with Langford, Chadakoin, Towerville, Schuyler, and Valois soils. They have a dense fragipan that is not present in Schuyler, Chadakoin, Towerville, and Valois soils. They are deeper over bedrock than Towerville soils and are wetter than Chadakoin and Valois soils. They do not have the clay accumulation in the subsoil that is typical of Langford soils and are more acid.

Typical pedon of Mardin channery silt loam, 8 to 15 percent slopes; in the town of Ellicott; ½ mile south of Salisbury Road and 1½ miles west of New York Route 60, on north side of logging road:

A—0 to 1 inch; very dark gray (10YR 3/1) channery silt loam; weak fine and medium granular structure; very friable; many fine and medium roots; about 15 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw—1 to 14 inches; yellowish brown (10YR 5/6) channery silt loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; many fine tubular and common fine vesicular pores; about 15 percent channery fragments; very strongly acid; clear wavy boundary.

E—14 to 18 inches; pale brown (10YR 6/3) channery silt loam; few fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; many fine vesicular pores and many coarse and medium tubular pores; about 15 percent channery fragments; strongly acid; clear broken boundary.

Bx1—18 to 32 inches; dark brown (7.5YR 4/4) channery silt loam; white (5Y 8/1) prism faces; common medium distinct dark grayish brown (10YR 4/2) mottles; strong coarse prismatic structure parting to strong fine and medium prismatic; very firm and brittle; few fine and medium roots along prism faces; about 25 percent channery fragments; few

fine tubular and vesicular pores; thin patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bx2—32 to 45 inches; dark yellowish brown (10YR 4/4) channery silt loam; light gray (5Y 7/1) prism faces and strong brown (7.5YR 5/6) thin rind ⅛ inch thick; few fine distinct grayish brown (10YR 5/6) mottles; weak very coarse prismatic structure; interior of prisms is massive; very firm and brittle; few fine medium roots in the upper part of horizon; common fine vesicular and occasional medium tubular pores that have thick patchy clay films; 20 percent channery fragments; strongly acid; gradual smooth boundary.

Cd—45 to 72 inches; dark brown (10YR 4/3) channery silt loam, few fine and medium distinct gray (5Y 6/1) and common fine faint yellowish brown (10YR 5/4) mottles; few very dark gray (10YR 3/1) manganese stains; massive; firm; common fine vesicular and tubular pores, some of which have thin patchy clay films; about 25 percent channery fragments; moderately acid.

The thickness of the solum ranges from 38 to 70 inches. The depth to bedrock is more than 60 inches. Depth to the top of the fragipan ranges from 14 to 26 inches. The content of rock fragments ranges, by volume, from 5 to 35 percent above the fragipan and from 15 to 60 percent in the fragipan and substratum. Reaction ranges from very strongly acid to moderately acid in the horizons above the fragipan. It ranges from very strongly acid to slightly acid in the fragipan and from strongly acid to neutral in the substratum.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 2 to 4. The texture is loam or silt loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 8. Structure is weak or moderate, fine or medium, subangular blocky or granular. The texture is loam or silt loam in the fine-earth fraction. Consistence is very friable or friable.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 or 3. The texture is loam or silt loam in the fine-earth fraction. Structure is weak, medium, platy or subangular blocky. Consistence is friable or firm.

The Bx horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It has faint to prominent mottles. The texture is loam or silt loam in the fine-earth fraction. Structure is weak to strong, very coarse prismatic. Consistence is firm or very firm.

The Cd horizon has colors and textures similar to those of the Bx horizon. Structure is weak, thin platy, or the material is massive. Consistence is firm or very firm.

Middlebury Series

The Middlebury series consists of very deep, moderately well drained, nearly level soils on flood plains and alluvial fans. These soils formed in alluvium derived from upland soils that have a high content of sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Middlebury soils are in a drainage sequence that includes the well drained Tioga soils, the somewhat poorly drained Holderton soils, and the very poorly drained Wayland soils. They are associated with Unadilla and Scio soils. They have a higher content of fine sand than Unadilla and Scio soils. They also are associated with Chenango and Pompton soils on nearby terraces but do not have the high gravel content that is typical of these soils.

Typical pedon of Middlebury silt loam; in the town of Villenova; 0.3 mile north of Balcom, on the north side of the streambank; 300 feet east of County Route 621:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; about 5 percent coarse fragments; many roots; neutral (limed); abrupt smooth boundary.

Bw1—6 to 18 inches; dark brown (10YR 4/3) very fine sandy loam; weak fine and medium subangular blocky structure; friable; common roots; neutral; abrupt wavy boundary.

Bw2—18 to 21 inches; brown (10YR 5/3) fine sandy loam; weak fine subangular blocky structure; very friable; about 2 percent coarse fragments; few roots; neutral; abrupt wavy boundary.

BC—21 to 43 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 5/1) mottles; gray (10YR 5/1) faces of peds; very weak thick platy structure parting to weak fine subangular blocky; friable; neutral; abrupt wavy boundary.

2C—43 to 72 inches; grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) loamy sand; single grained; loose; about 10 percent coarse fragments; slightly acid.

The thickness of the solum ranges from 15 to 45 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 20 percent to a depth of 40 inches and from 0 to 50 percent below this depth. In areas that have not been limed, reaction ranges from strongly acid to slightly acid in the surface layer and from moderately acid to neutral in the subsoil and substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is loam, fine sandy loam, or silt loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. High-chroma mottles are in all horizons in some pedons. Low-chroma mottles are in the B horizon within a depth of 24 inches. The texture is very fine sandy loam, fine sandy loam, loam, or silt loam in the fine-earth fraction. Structure is weak or moderate, fine to coarse, subangular blocky or prismatic. Consistence is friable or very friable.

The BC horizon has colors and textures similar to those of the B horizon. Structure is weak, subangular blocky or platy. Consistence is friable or very friable.

The 2C horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 1 to 4. The texture ranges from loam to loamy sand in the fine-earth fraction. Consistence is friable or firm.

Minoa Series

The Minoa series consists of very deep, somewhat poorly drained, nearly level soils on remnant deltas and beaches on the lake plains of former glacial lakes. These soils formed in lake-laid deposits that have a high content of very fine sand or fine sand. Slopes range from 0 to 3 percent.

Minoa soils are in a drainage sequence that includes the poorly drained and very poorly drained Lamson soils. They are associated with Niagara, Raynham, Canandaigua, and Halsey soils. They contain less clay and silt than Niagara and Raynham soils. They are better drained than the silty Canandaigua and Halsey soils. They do not have the gravel content that is typical of Halsey soils.

Typical pedon of Minoa fine sandy loam; in the town of Pomfret; 800 feet north of the intersection of Farel Road and Berry Road, 50 feet west of Farel Road:

Ap—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine and medium granular structure; very friable; many roots; strongly acid; abrupt smooth boundary.

Bw1—5 to 12 inches; yellowish brown (10YR 5/4) fine sandy loam; common medium distinct strong brown (7.5YR 5/8), red (2.5YR 4/6), and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common roots; strongly acid; clear smooth boundary.

Bw2—12 to 22 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct strong brown (7.5YR 5/8), gray (10YR 6/1), and light brownish gray (10YR 6/2) mottles; lamellae ½ inch to 2 inches thick having gray (10YR 6/1) interiors and strong brown (7.5YR 5/8) exteriors with loam texture; common faint bridging of sand grains; weak medium subangular blocky structure; friable; few roots; neutral; clear wavy boundary.

BC—22 to 35 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct strong brown (7.5YR 5/8), yellowish red (5YR 5/6), and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few roots; neutral; clear wavy boundary.

C1—35 to 48 inches; brown (10YR 5/3) very fine sandy loam; common medium distinct strong brown (7.5YR 5/6) and common medium faint light brownish gray (10YR 6/2) mottles; weak medium and thin platy structure; friable; neutral; clear wavy boundary.

2C2—48 to 72 inches; dark brown (10YR 4/3) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; firm; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The depth to carbonates is 40 to 72 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent throughout the profile. Reaction ranges from strongly acid to neutral in the surface layer and subsoil and from moderately acid to moderately alkaline in the substratum.

The Ap horizon has hue of 5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam to loamy very fine or fine sandy loam.

The Bw horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is very fine sandy loam, fine sandy loam, loamy fine sand, or silt loam. This horizon has few to many, high- and low-chroma mottles. Structure is weak, granular or subangular blocky, or the material is massive. Consistence ranges from very friable to firm.

The BC horizon has colors and textures similar to those of the B horizon. Structure is weak, granular, subangular blocky, or platy.

The C and 2C horizons have hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 1 to 4. The texture ranges from silt loam to loamy fine sand and includes thin layers of silty clay loam to fine sand. Consistence is friable or firm.

Niagara Series

The Niagara series consists of very deep, somewhat poorly drained, nearly level and gently sloping soils on lake plains. These soils formed in silty lacustrine sediment that was deposited in former glacial lakes. Slopes range from 0 to 8 percent.

Niagara soils are in a drainage sequence that includes the moderately well drained Collamer soils and the poorly drained and very poorly drained Canandaigua soils. They are in landscape positions

similar to those of Niagara, Raynham, Barcelona, Rhinebeck, and Minoa soils. They have a higher content of clay in the subsoil than the silty Raynham soils. They do not have the sandy subsoil that is typical of Minoa soils and have a lower content of clay than Rhinebeck soils. They do not have the gravelly or shaly subsoil that is typical of Barcelona soils.

Typical pedon of Niagara silt loam, 0 to 3 percent slopes, loamy substratum; in the town of Pomfret; ¼ mile west of the intersection of Interstate 90 and Van Buren Road, 25 yards north of Van Buren Road:

Ap—0 to 12 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; friable; many fine roots; moderately acid; abrupt smooth boundary.

E—12 to 15 inches; pale brown (10YR 6/3) silt loam; many medium distinct yellowish brown (10YR 5/6) and common medium distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; neutral; clear wavy boundary.

Bt—15 to 26 inches; dark brown (10YR 4/3) silty clay loam; many fine faint grayish brown (10YR 5/2) and common fine and medium distinct yellowish brown (10YR 5/6) mottles; grayish brown (2.5Y 5/2) faces of peds; reddish brown (5Y 5/3) inherited bodies; moderate medium coarse subangular blocky structure; firm; few fine roots; common fine tubular and vesicular pores; continuous clay and silt films in pores; common faint clay films on faces of peds; neutral; clear smooth boundary.

BC—26 to 37 inches; dark brown (10YR 4/3) silty clay loam; many fine faint yellowish brown (10YR 5/6) and common fine distinct gray (5Y 6/1) mottles; light brownish gray (2.5Y 6/2) faces of peds; reddish brown (5YR 5/3) and light gray (2.5Y 7/2) inherited bodies of calcium carbonate; very weak very coarse angular blocky structure; firm; few fine roots; common fine tubular and vesicular pores; about 1 percent gravel; moderately alkaline; slightly effervescent; clear smooth boundary.

C1—37 to 45 inches; brown (10YR 5/3) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; thin platy structure; inherited varving; firm; about 2 percent gravel; moderately alkaline; strongly effervescent; clear smooth boundary.

C2—45 to 51 inches; light olive brown (2.5Y 5/4), light olive gray (5Y 6/2), and strong brown (7.5YR 5/6) silt loam; thin and medium platy structure; firm; about 5 percent gravel; moderately alkaline; strongly effervescent; clear smooth boundary.

C3—51 to 60 inches; reddish brown (5YR 5/4) silt loam; strong brown (7.5YR 5/6) and brown (10YR 5/3) varves; few vertical streaks that are 18 to 24 inches long and have gray interiors and reddish exteriors; weak medium and thick platy structure; firm; about 5 percent gravel; moderately alkaline; strongly effervescent; clear smooth boundary.

2C4—60 to 72 inches; dark gray (N 4/0) gravelly loam and silty clay loam; massive; very firm; few fine pores; about 20 percent gravel; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent in the surface layer, subsoil, and the upper part of the substratum and from 15 to 35 percent in the lower part of the substratum. The depth to carbonates ranges from 20 to 50 inches. Reaction ranges from strongly acid to neutral in the surface layer, from moderately acid to mildly alkaline in the subsoil, and from neutral to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is very fine sandy loam, loam, or silt loam.

The E horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It has faint to prominent mottles. The texture is silt loam, very fine sandy loam, or fine sandy loam, but some horizons have coarser texture. Structure is weak or moderate, medium, subangular or angular blocky. Consistence is friable or firm.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It has faint to prominent mottles. The texture is silt loam, very fine sandy loam, or silty clay loam. Structure is weak or moderate, medium, subangular or angular blocky. Consistence is friable or firm.

The BC horizon has colors and textures similar to those of the Bt horizon. Structure is weak, subangular or angular blocky or platy. Consistence is friable or firm.

The C and 2C horizons have hue of 5Y to 2.5Y, value of 3 to 6, and chroma of 2 or 3. They are stratified fine sand to clay. Consistence is friable or firm.

Onoville Series

The Onoville series consists of very deep, moderately well drained, moderately steep soils on hilltops, ridgetops, and benches of unglaciated plateaus. These soils formed in colluvium or material weathered from interbedded shale, siltstone, and fine grained sandstone. Slopes range from 10 to 25 percent.

Onoville soils are associated with Carrollton, Frewsburg, Kinzua, Schuyler, and Chautauqua soils.

They are deeper over bedrock than Carrollton and Frewsburg soils and have a fragipan that is not present in Kinzua soils. Schuyler and Chautauqua soils formed in glacial till and are at lower elevations than Onoville soils.

Typical pedon of Onoville silt loam, 10 to 25 percent slopes; in the town of Carroll; ¾ mile south of the intersection of Wheeler Hill Road and Gurnsey Hollow Road, 20 feet northeast of Gurnsey Hollow Road:

A—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; about 5 percent channery fragments; strongly acid; clear smooth boundary.

BE—2 to 17 inches; yellowish brown (10YR 5/4) silt loam; moderate medium and fine subangular blocky structure; friable; common fine roots; about 5 percent channery fragments; strongly acid; clear wavy boundary.

2Btx1—17 to 24 inches; yellowish brown (10YR 5/4) channery silt loam; common medium distinct yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm, slightly brittle; few fine roots; about 20 percent channery fragments; common faint light brownish gray (10YR 6/2) clay films in pores and on faces of peds; strongly acid; clear wavy boundary.

3Btx2—24 to 38 inches; yellowish brown (10YR 5/4) gravelly silt loam; common medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; moderate very coarse prismatic structure, massive within prisms; firm, slightly brittle; common distinct clay flows in pores and on faces of peds; about 20 percent gravel; strongly acid; clear wavy boundary.

3C—38 to 72 inches; yellowish brown (10YR 5/4) gravelly silt loam; massive parting to weak platy structure along shale lines; firm; thick clay flows in pores; about 30 percent gravel; strongly acid.

The thickness of the solum ranges from 35 to 70 inches. The depth to bedrock is more than 60 inches. The content of rock fragments consisting mainly of shale and siltstone ranges, by volume, from 5 to 35 percent in the surface layer, from 5 to 40 percent in the subsoil, and from 15 to 70 percent in the substratum. Reaction commonly is very strongly acid or strongly acid, but it is moderately acid in some parts of the substratum.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or loam.

The BE horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 6. The texture is silt loam, silty clay loam, or loam. Structure is weak or moderate, fine or medium, subangular blocky or granular. Consistence is very friable or friable.

The Btx horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 6. Low- and high-chroma mottles are in the upper 10 inches of the argillic horizon. The texture is silt loam, loam, silty clay loam, or clay loam in the fine-earth fraction. Structure is weak or moderate, fine to coarse, subangular blocky or prismatic. Consistence is firm or very firm and brittle or slightly brittle.

The C horizon has colors and textures similar to those of the Btx horizon. It has weak, prismatic or platy structure, or the material is massive. Consistence is firm or very firm.

Orpark Series

The Orpark series consists of moderately deep, somewhat poorly drained, nearly level to moderately steep soils on the crests of plateaus and the summits of uplands. These soils formed in a thin mantle of glacial till and are underlain by siltstone and shale at a depth of 20 to 40 inches. Slopes range from 0 to 25 percent.

Orpark soils are in a drainage sequence that includes the moderately well drained Towerville soils. They are in landscape positions similar to those of Orpark, Fremont, Volusia, and Hornell soils. They are not so deep over bedrock as Volusia and Fremont soils. They have less clay in the subsoil than Hornell soils.

Typical pedon of Orpark silt loam, 3 to 8 percent slopes; in the town of Ellicott; ¼ mile east and 20 yards south of the intersection of Turner Road and County Route 339:

A—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct grayish brown (10YR 5/2) and few fine distinct yellowish red (5YR 5/8) mottles; moderate fine and medium granular structure; very friable; many fine and medium roots; about 5 percent channery fragments; very strongly acid; clear smooth boundary.

BA—3 to 7 inches; dark brown (10YR 4/3) silt loam; common fine faint yellowish brown (10YR 5/4) and few medium distinct yellowish red (5YR 4/6) mottles; weak fine and medium subangular blocky structure; very friable; common fine roots; common fine vesicular and tubular pores; about 5 percent channery fragments; very strongly acid; clear smooth boundary.

Bw1—7 to 13 inches; light yellowish brown (10YR 6/4) silt loam; light gray (10YR 7/2) faces of peds; many medium distinct light gray (10YR 7/2) and common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure;

friable; few fine roots along faces of peds; many fine tubular and common fine vesicular pores; very thin and very patchy clay skins along vesicular pores; about 5 percent channery fragments; very strongly acid; clear smooth boundary.

Bw2—13 to 26 inches; dark yellowish brown (10YR 4/4) channery silt loam; many fine and medium distinct light gray (5YR 7/1), common fine and medium distinct strong brown (7.5YR 5/8), and few faint yellowish red (5YR 4/8) mottles; moderate very coarse prismatic structure parting to weak medium and coarse angular blocky; firm; few fine roots in the upper part of horizon; many fine vesicular and few fine tubular pores; few faint thin clay linings in most tubular pores; gray (5Y 6/1) prism faces that have silt coatings and dark brown (7.5YR 4/4) prism rinds; about 20 percent channery fragments; the lower 3 inches is partially weathered shale or siltstone fragments mixed with soil matrix material; strongly acid; abrupt wavy boundary.

2R—26 inches; siltstone bedrock.

The thickness of the solum ranges from 20 to 32 inches. The depth to bedrock ranges from 20 to 40 inches. The content of rock fragments consisting mainly of soft shale, siltstone, or fine grained sandstone ranges, by volume, from 0 to 10 percent in the surface layer and from 0 to 20 percent in the subsoil. Reaction is very strongly acid or strongly acid throughout the profile.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The texture is loam, silt loam, or silty clay loam.

The BA horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam or silty clay loam. Structure is weak, subangular or angular blocky. Consistence is very friable or friable.

The Bw horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam or silty clay loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, subangular blocky or prismatic. Consistence is friable or firm.

The C horizon, if it occurs, has colors and textures similar to those of the Bw horizon.

Palms Series

The Palms series consists of very deep, very poorly drained, nearly level soils in depressional areas on lake plains and till plains throughout the county. These soils formed in decomposed organic deposits underlain by loamy mineral soil material at a depth of 16 to 50 inches. Slopes range from 0 to 3 percent.

Palms soils are associated with Carlisle, Henrietta, Halsey, Canandaigua, and Alden soils. They have a deeper organic deposit than Henrietta soils, and they do not have the sandy mineral deposits that are typical of Henrietta soils. They are shallower to mineral deposits than Carlisle soils. They do not have the high content of silt and clay that is typical of Canandaigua soils. They do not have the content of rock fragments that is typical of Alden soils, which commonly are adjacent to Palms soils.

Typical pedon of Palms muck; in the town of Kiantone; 1 mile south of the intersection of New York Route 62 and Stillwater-Frewsburg Road, 500 feet east of New York Route 62:

Oa1—0 to 11 inches; black (10YR 2/1) sapric material, broken face and rubbed; about 5 percent herbaceous fibers, less than 5 percent rubbed; weak medium granular structure; friable; about 20 percent mineral material; slightly acid; clear smooth boundary.

Oa2—11 to 18 inches; very dark gray (10YR 3/1) sapric material, broken face and rubbed; about 2 percent herbaceous fibers, less than 2 percent rubbed; massive; slightly sticky; about 20 percent mineral material; slightly acid; clear smooth boundary.

Oa3—18 to 36 inches; black (10YR 2/1) sapric material, broken face and rubbed; about 40 percent woody fibers, less than 5 percent rubbed; massive; friable; about 15 percent mineral material; slightly acid; abrupt smooth boundary.

2Cg—36 to 72 inches; dark gray (5Y 4/1) silty clay loam; massive; friable; neutral.

The depth to the underlying mineral material ranges from 16 to 50 inches. The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to mildly alkaline in the organic material and from slightly acid to moderately alkaline in the underlying mineral material. The content of fragments of twigs, branches, or logs in the organic material ranges from 0 to 15 percent.

The surface tier is dominantly black (10YR 2/1) or very dark brown (10YR 2/2) sapric material.

The organic subsurface tiers have hue of 5YR to 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 3. They commonly are massive or have weak, platy structure. The organic material is mainly sapric material.

The 2C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is fine sandy loam, loam, silt loam, silty clay loam, or clay loam.

Pompton Series

The Pompton series consists of very deep, moderately well drained, nearly level soils on terraces,

outwash plains, and remnant deltas. These soils formed in glacial outwash deposits that have a high content of sand and gravel. Slopes range from 0 to 3 percent.

Pompton soils are in a drainage sequence that includes the well drained to somewhat excessively drained Chenango soils, the somewhat poorly drained Red Hook soils, and the very poorly drained Halsey soils. They are associated with Valois, Chautauqua, Scio, Collamer, and Allard soils. They have more gravelly fragments in the subsoil and substratum than the silty Scio and Collamer soils. They are less well drained than Allard soils and do not have the silty mantle that is typical of those soils. Valois and Chautauqua soils are on uplands.

Typical pedon of Pompton silt loam; in the town of Villenova; 200 yards south of New York Route 322, 1½ miles east of Balcoms Corners:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak medium and fine granular structure; friable; many fine roots; about 10 percent gravel; strongly acid; abrupt smooth boundary.

Bw1—10 to 22 inches; brown (7.5YR 5/4) gravelly sandy loam; weak medium and fine subangular blocky structure; very friable; many fine roots; about 20 percent gravel; strongly acid; clear wavy boundary.

Bw2—22 to 34 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; very weak fine and medium subangular blocky structure; very friable; common fine roots; about 25 percent gravel; strongly acid; clear wavy boundary.

2C—34 to 72 inches; brown (10YR 5/3) gravelly loamy sand; single grained; loose; about 25 percent gravel; strongly acid.

The thickness of the solum ranges from 24 to 36 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 35 percent in the surface layer and subsoil and from 0 to 75 percent in the substratum. Reaction is strongly acid or very strongly acid throughout the profile.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. The texture is sandy loam, silt loam, or loam.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. It has high- or low-chroma mottles. The texture is fine sandy loam or sandy loam or the gravelly analogs of those textures. Structure is fine or medium, subangular blocky to moderate, subangular blocky or granular. Consistence is friable or very friable.

The C horizon has hue of 7.5YR or 5Y, value of 4 to 6, and chroma of 2 to 4. It is sand to sandy loam or the gravelly analogs of the textures within that range.

Raynham Series

The Raynham series consists of very deep, somewhat poorly drained, nearly level and gently sloping soils on low flats and in basins on former lake plains. These soils formed in lake-laid deposits that have a high content of silt and very fine sand. Slopes range from 0 to 8 percent.

Raynham soils are in a drainage sequence that includes the well drained Unadilla soils and the moderately well drained Scio soils. They are associated with Swormville, Getzville, Lamson, Canandaigua, and Niagara soils. They are better drained than Lamson and Canandaigua soils, are not so sandy as Lamson soils, and have a lower content of clay than Canandaigua soils. They are coarser textured than Niagara soils, and they do not have the fine textured mantle that is typical of Swormville and Getzville soils.

Typical pedon of Raynham silt loam, 0 to 3 percent slopes; in the town of Cherry Creek; 660 feet northeast of the intersection of Mile Strip Road and Kent Switch Road, 20 yards west of Mile Strip Road:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) and light brownish gray (10YR 6/2) silt loam; moderate fine granular structure; friable; many fine roots; moderately acid; abrupt smooth boundary.

Bw—7 to 12 inches; dark brown (10YR 4/3) silt loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; friable; common fine roots; light brownish gray (10YR 6/2) faces of peds; slightly acid; clear smooth boundary.

Bg—12 to 24 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine roots; light brownish gray (10YR 6/2) faces of peds; slightly acid; clear smooth boundary.

Cg—24 to 72 inches; grayish brown (2.5Y 5/2) silt loam; few medium distinct strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6) mottles; massive; firm; few fine roots; slightly acid.

The thickness of the solum ranges from 16 to 37 inches. The depth to bedrock is more than 60 inches. The content of rock fragments commonly is less than 2 percent throughout the profile. Reaction ranges from strongly acid to neutral in the surface layer and subsoil and from moderately acid to mildly alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3. The texture is silt loam or very fine sandy loam.

The B horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt, silt loam, or very fine sandy loam. Structure is weak or moderate, fine or medium, granular or subangular blocky. Consistence is friable or firm.

The C horizon has colors and textures similar to those of the B horizon. It is massive or has varves that differ from each other in color and texture. Consistence is friable or firm.

Red Hook Series

The Red Hook series consists of very deep, somewhat poorly drained, nearly level soils on outwash plains, remnant beaches, and stream terraces. These soils formed in glacial outwash and stream deposits. Slopes range from 0 to 3 percent.

Red Hook soils are in a drainage sequence that includes the well drained to somewhat excessively drained Chenango soils, the moderately well drained Pompton soils, and the very poorly drained Halsey soils. They are associated with Raynham, Swormville, Scio, and Busti soils. They do not have the high silt content that is typical of Raynham and Scio soils, and they contain more rock fragments than those soils. They do not have the finer textured mantle that is typical of Swormville soils. Red Hook soils formed in outwash and have a stratified substratum, and Busti soils formed in glacial till.

Typical pedon of Red Hook silt loam; in the town of Villenova; 400 yards south of Balcoms Corners and 60 yards east of New York Route 83:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine roots; about 5 percent gravel; neutral (limed); abrupt smooth boundary.

Bg1—10 to 19 inches; grayish brown (10YR 5/2) loam; many medium distinct brown (7.5YR 5/4) and strong brown (7.5YR 5/6) mottles; brown (10YR 5/3) faces of peds; weak medium subangular blocky structure; friable; few fine roots; manganese concretions; about 10 percent gravel; slightly acid; clear wavy boundary.

Bg2—19 to 32 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and common coarse distinct grayish brown (10YR 5/2) mottles; very weak subangular blocky structure; friable; about 15 percent gravel; neutral; clear irregular boundary.

2Cg1—32 to 48 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam; massive; firm; about 40 percent gravel; neutral; clear smooth boundary.

2Cg2—48 to 72 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam that includes thin strata of very gravelly loamy sand; massive; firm; about 40 percent gravel; neutral.

The thickness of the solum ranges from 20 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 5 to 15 percent in the surface layer, from 10 to 60 percent in the subsoil, and from 15 to 65 percent in the substratum. In areas that have not been limed, reaction ranges from strongly acid to slightly acid in the surface layer, from moderately acid to neutral in the subsoil, and from moderately acid to mildly alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or 3. The texture is fine sandy loam, loam, or silt loam in the fine-earth fraction.

The Bg horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The texture is sandy loam, loam, or silt loam in the fine-earth fraction. Structure is weak, fine or medium, subangular blocky. Consistence is friable or firm.

The 2Cg horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 1 to 3. The texture is quite variable. It ranges from gravelly or very gravelly loamy sand to gravelly or very gravelly silt loam. Consistence is friable or firm.

Rhinebeck Series

The Rhinebeck series consists of very deep, somewhat poorly drained, nearly level and gently sloping soils on lake plains and valley side slopes. These soils formed in glacial lake-laid sediment that is high in content of clay and silt. Slopes range from 0 to 3 percent.

Rhinebeck soils are in a drainage sequence that includes the poorly drained Canadice soils. They are associated with Churchville, Barcelona, Niagara, and Canandaigua soils. They are better drained than the silty Canandaigua soils, and they contain more clay than the silty Niagara soils. They do not have the rock fragments in the substratum that are associated with Churchville and Barcelona soils. Also, Barcelona soils have bedrock at a depth of 40 to 60 inches.

Typical pedon of Rhinebeck silt loam, 0 to 3 percent slopes; in the town of Pomfret; 300 feet west of New York Route 60, in a borrow pit ½ mile north of Darby Switch Road:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak medium and coarse granular structure; friable;

common fine roots; moderately acid; abrupt smooth boundary.

E—8 to 15 inches; grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium and coarse subangular blocky structure; friable; common fine roots; common fine pores; moderately acid; clear smooth boundary.

Bt1—15 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; gray (10YR 6/1) faces of peds; common medium distinct light brownish gray (10YR 6/2) and few fine faint strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; firm, plastic; common fine roots, mostly along prism faces; common fine pores; many faint dark grayish brown (10YR 4/2) clay films on prism faces and thick clay linings in pores; slightly acid; gradual wavy boundary.

Bt2—27 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; gray (10YR 6/1) faces of peds; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; firm, plastic; few fine roots, mostly along prism faces; common faint patchy clay films on prisms and thin clay linings in pores; neutral; gradual smooth boundary.

C—44 to 72 inches; dark brown (10YR 4/3), varved silt and clay with some fine sand; moderately alkaline; strongly effervescent.

The thickness of the solum ranges from 20 to 48 inches. The depth to carbonates ranges from 20 to 60 inches. The depth to bedrock is more than 60 inches. Rock fragments commonly are not present in the profile, but in some pedons they make up as much as 10 percent of the profile. Reaction ranges from strongly acid to neutral in the surface layer, from strongly acid to mildly alkaline in the subsoil, and from slightly acid to moderately alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3. The texture is silt loam or silty clay loam.

The E horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 3. The texture is silt loam, very fine sandy loam, or silty clay loam. Structure is weak or moderate, subangular blocky or platy. Consistence ranges from very friable to firm.

The Bt horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 2 to 4. It has distinct, high- or low-chroma mottles. The texture is silty clay loam or silty clay. Structure is weak to strong, prismatic to subangular blocky. Consistence is firm or very firm.

The C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The texture commonly ranges from silty clay loam to clay, but in some horizons the range includes fine sand. This horizon is massive and may be varved.

Saprists

Saprists consist of very deep, very poorly drained organic soils. These soils formed in deposits of well decomposed herbaceous and woody plant remnants. They are ponded with shallow water throughout much of the year and commonly are termed freshwater marsh. They commonly are level and are in low and depressional areas adjacent to lakes.

Saprists are mapped with Aquents. Some areas contain both of these soils, while other areas consist mainly of one or the other. Saprists commonly are near Carlisle, Palms, Canandaigua, Alden, and Wayland soils, where periods of ponding and flooding are brief.

Because of the variability of Saprists, a typical pedon is not provided. Saprists have organic deposits 16 to 60 inches thick over mineral soil deposits. The depth to bedrock is more than 60 inches. Woody fragments make up 0 to 20 percent of the organic layers. The soils are very strongly acid to neutral in the organic part of the profile and are strongly acid to moderately alkaline in the mineral substratum.

The O layer mainly has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It consists mainly of well decomposed sapric material.

The mineral C horizon has hue of 5YR to 5Y or is neutral in hue. It has value of 1 to 6 and chroma of 0 to 4. It is loamy sand to silty clay or the gravelly and very gravelly analogs of the textures within that range.

Schuyler Series

The Schuyler series consists of very deep, moderately well drained, gently sloping to very steep soils on valley sides and on other side slopes of upland plateaus. These soils formed in glacial till derived from silty shale, siltstone, and sandstone. Slopes range from 3 to 50 percent.

Schuyler soils are in a drainage sequence that includes the somewhat poorly drained Fremont soils and the poorly drained Ashville soils. They are associated with Mardin, Chadakoin, Towerville, and Orpark soils. They are finer textured than Mardin soils, and they do not have the dense fragipan that is characteristic of Mardin soils. They are deeper over bedrock than Towerville soils, which have bedrock within a depth of 40 inches. They are wetter and contain less clay than Chadakoin soils, and they are better drained and deeper over bedrock than Orpark soils.

Typical pedon of Schuyler silt loam, 3 to 8 percent slopes; in the town of Gerry; ½ mile north of the intersection of County Route 603 and Harris Hill Road; ½ mile east of Harris Hill Road, on Forest Service road:

Oe—3 inches to 0; black (10YR 2/1), partly decomposed leaves, twigs, and other organic matter; about 5 percent channery fragments; abrupt smooth boundary.

Bw1—0 to 9 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; very friable; many fine and medium roots; occasional large roots; about 5 percent channery fragments; strongly acid; gradual wavy boundary.

Bw2—9 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; many fine and medium roots; about 10 percent channery fragments; strongly acid; clear wavy boundary.

Bw3—18 to 29 inches; brown (10YR 5/3) channery silt loam; many medium and fine yellowish red (5YR 5/6) and light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; about 20 percent channery fragments; strongly acid; clear wavy boundary.

C1—29 to 38 inches; brownish gray (2.5Y 5/2) channery silty clay loam; yellowish red (5YR 4/8) mottles; light olive gray (5Y 6/2) faces of peds; weak medium platy structure; firm; few fine roots along prism faces; few fine tubular and few large vesicular pores; about 20 percent channery fragments; strongly acid; clear wavy boundary.

C2—38 to 72 inches; brown (10YR 4/3) channery silty clay loam; pinkish gray (5YR 6/2) and strong brown (7.5YR 5/6) mottles; massive; firm; medium and fine tubular pores; about 25 percent channery fragments; strongly acid.

The thickness of the solum ranges from 20 to 48 inches. The depth to bedrock commonly is more than 60 inches, but in some pedons bedrock is at a depth of 40 inches. The content of rock fragments ranges, by volume, from 5 to 35 percent in the solum and from 20 to 60 percent in the substratum. Reaction ranges from very strongly acid to moderately acid throughout the profile.

Many pedons have an Ap or A horizon, which has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 3. This horizon is silt loam, fine sandy loam, or loam.

The Bw horizon has hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 3 to 6. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, subangular blocky. Consistence ranges from very friable to firm.

The C horizon has hue of 7.5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The texture is loam, silt loam, or silty clay loam in the fine-earth fraction. This horizon is massive or has platy structure.

Scio Series

The Scio series consists of very deep, moderately well drained, nearly level and gently sloping soils on terraces of old alluvial fans. These soils formed in wind- or water-deposited silt and very fine sand. Slopes range from 0 to 8 percent.

Scio soils are in a drainage sequence that includes the well drained Unadilla soils and the somewhat poorly drained Raynham soils. They are associated with Pompton, Allard, and Collamer soils. They have less clay in the subsoil than Collamer soils, and they do not have the contrasting gravelly deposits that are typical of Allard soils. They do not have the gravelly rock fragments that are associated with Pompton soils.

Typical pedon of Scio silt loam, 0 to 3 percent slopes; in the town of Ellington; 1,000 feet east of the intersection of North Hill Road and New York Route 62, 40 feet north of New York Route 62:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; friable; many fine roots; about 2 percent gravel; strongly acid; abrupt smooth boundary.

Bw1—9 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw2—16 to 21 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; strongly acid; clear wavy boundary.

Bw3—21 to 31 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/8) and common medium distinct gray (10YR 6/1) mottles; gray (10YR 6/1) faces of peds; moderate medium subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

C1—31 to 48 inches; brown (10YR 4/3) very fine sandy loam; common medium distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; gray (10YR 6/1) faces of peds; weak thick platy structure; friable; few fine roots; strongly acid; abrupt wavy boundary.

2C2—48 to 72 inches; dark brown (10YR 4/3) very gravelly loam; massive; friable; about 45 percent gravel; moderately acid.

The thickness of the solum ranges from 20 to 36 inches. The depth to material that has texture different from that in the solum is more than 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent above a depth of 40 inches and from 0 to 60 percent below this depth. Reaction ranges from very strongly acid to moderately acid to a depth of 40 inches and from strongly acid to mildly alkaline below this depth.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 3. The texture is silt loam or very fine sandy loam.

The B horizon has hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 3 to 6. It has high- or low-chroma mottles. The texture is silt loam or very fine sandy loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, subangular blocky or platy. Consistence is very friable or friable.

The C and 2C horizons have hue of 7.5YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The texture of the fine-earth fraction is silt loam or very fine sandy loam to a depth of 40 inches and is silt loam to stratified sand and gravel below this depth. These horizons are massive or single grained, or they have weak, platy structure. Consistence is friable or firm.

Swormville Series

The Swormville series consists of very deep, somewhat poorly drained, nearly level soils on broad valley flats and lake plains. These soils formed in silty lacustrine deposits and old alluvial deposits that are high in content of silt and clay and are underlain by sandy lake-laid sediment. Slopes range from 0 to 3 percent.

Swormville soils are in a drainage sequence that includes the poorly drained Getzville soils. They are associated with Raynham, Minoa, Niagara, and Canandaigua soils. They have more clay in the surficial mantle than Raynham soils, and they are not so sandy in the upper part of the mantle as Minoa soils. They are better drained than Canandaigua soils. The silty Niagara soils are not underlain by sand.

Typical pedon of Swormville silt loam; in the town of Villenova; 1½ miles north of the intersection of Kent Switch Road and Mile Strip Road, 30 yards east of Mile Strip Road:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—10 to 16 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; brown (10YR 5/2) faces of peds; common distinct clay films on faces of peds and in pores; slightly acid; clear wavy boundary.

Bt2—16 to 25 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; firm; fine roots; common distinct clay films on faces of peds and in pores; slightly acid; abrupt wavy boundary.

2BCg—25 to 30 inches; grayish brown (10YR 5/2) loamy fine sand; very weak fine subangular blocky structure; very friable; slightly acid; clear wavy boundary.

2Cg—30 to 72 inches; grayish brown (10YR 5/2) sand; single grained; loose; about 10 percent gravel; neutral (mildly alkaline at a depth of 65 inches); slightly effervescent.

The thickness of the solum ranges from 25 to 45 inches. Depth to the underlying sandy material ranges from 20 to 38 inches. The depth to bedrock is more than 60 inches. The content of rock fragments consisting mainly of gravel ranges, by volume, from 0 to 5 percent in the Ap and Bt horizons and from 0 to 40 percent in the 2BC and 2C horizons. Reaction ranges from strongly acid to neutral in the Ap horizon, from moderately acid to neutral in the Bt horizon, and from slightly acid to mildly alkaline in the 2C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 2 or 3. The texture is silt loam or silty clay loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 3 to 6, and chroma of 2 to 4. It has high- and low-chroma mottles. The texture is loam, silt loam, or silty clay loam. Structure is weak to strong, subangular blocky or prismatic. Consistence is friable or firm.

The 2BC horizon has colors similar to those of the Bt horizon. The texture ranges from loamy fine sand to clay loam in the fine-earth fraction. Consistence is very friable, friable, or loose.

The 2C horizon has hue of 5YR to 5Y, value of 3 to 5, and chroma of 1 to 4. The texture ranges from loamy fine sand to sand in the fine-earth fraction. Consistence is very friable or loose.

Teel Series

The Teel series consists of very deep, moderately well drained, nearly level soils on flood plains along major streams. These soils formed in silty alluvial sediment. Slopes range from 0 to 3 percent.

Teel soils are in a drainage sequence that includes the well drained Hamlin soils, the somewhat poorly

drained Wakeland soils, and the poorly drained and very poorly drained Wayland soils. They are associated with Middlebury, Tioga, Raynham, Scio, and Canandaigua soils. Raynham and Scio soils formed in silty lacustrine deposits. Teel soils have more clay in the subsoil than Canandaigua soils. They do not have the content of sand and gravel that is typical of Middlebury and Tioga soils and are more silty.

Typical pedon of Teel silt loam; in the town of Villenova; 150 yards northwest of Skunks Corners, on an eroded streambank of the West Branch of Conewango Creek:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bw1—6 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine roots; neutral; clear smooth boundary.

Bw2—12 to 19 inches; brown (10YR 5/3) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; moderately acid; clear wavy boundary.

Bw3—19 to 28 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and common fine distinct strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

C—28 to 42 inches; brown (10YR 5/3) silt loam; many medium distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; massive; friable; moderately acid; clear wavy boundary.

Cg—42 to 72 inches; grayish brown (10YR 5/2) fine sandy loam; massive; very friable; moderately acid.

The thickness of the solum ranges from 24 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments commonly is, by volume, less than 5 percent in the surface layer and subsoil but ranges from 0 to 20 percent in the substratum. Reaction ranges from strongly acid to neutral above a depth of 30 inches and from moderately acid to mildly alkaline below this depth.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 to 3. The texture is silt loam or very fine sandy loam.

The B horizon has hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam or very fine sandv loam. Structure is weak or moderate, medium or coarse, subangular blocky to prismatic. Consistence is friable or very friable.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4. The texture is silt loam, very fine sandy loam, or fine sandy loam in the fine-earth fraction. This horizon is massive or has platy structure. Consistence ranges from very friable to firm.

Tioga Series

The Tioga series consists of very deep, well drained, nearly level soils on flood plains along major streams and creeks. These soils formed in alluvium derived mainly from parent material containing sandstone, siltstone, and shale. Slopes range from 0 to 3 percent.

Tioga soils are in a drainage sequence that includes the moderately well drained Middlebury soils and the somewhat poorly drained Holderton soils. They are associated with Hamlin, Teel, Chenango, and Unadilla soils. They have a lower silt content than Hamlin and Teel soils, which also are on flood plains. They contain less silt but more rock fragments than Unadilla soils, which are in the higher positions on terraces. They do not have the high gravel content that is typical of Chenango soils.

Typical pedon of Tioga silt loam; in the town of Kiantone; 3,300 feet southeast of the intersection of Norby Road and Peck Settlement Road:

Ap—0 to 11 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bw1—11 to 26 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bw2—26 to 32 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few fine roots; moderately acid; gradual wavy boundary.

2BC—32 to 38 inches; yellowish brown (10YR 5/4) gravelly loam; many coarse distinct grayish brown (10YR 5/2) and common fine distinct reddish brown (5YR 4/4) and dark brown (7.5YR 4/4) mottles; massive; loose; about 30 percent fine gravel; moderately acid; clear wavy boundary.

2C1—38 to 47 inches; brown (7.5YR 5/4) very gravelly loam; massive; loose; about 40 percent gravel; moderately acid; clear wavy boundary.

2C2—47 to 72 inches; grayish brown (10YR 5/2) very gravelly sandy loam; individual strata of sand and gravel; single grained; loose; about 50 percent gravel; slightly acid.

The thickness of the solum ranges from 18 to 40 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 0 to 35 percent in individual layers of the solum and from 0 to 60 percent in the substratum. Reaction ranges from strongly acid to neutral in the surface layer and subsoil and from moderately acid to mildly alkaline in the substratum.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is fine sandy loam or silt loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture ranges from fine sandy loam to silt loam in the fine-earth fraction. Structure is weak or moderate, fine to coarse, blocky, prismatic, or granular. Consistence is very friable or friable.

The 2BC horizon has colors and textures similar to those of the B horizon. Structure is weak, subangular blocky, or the material is massive. Consistence is very friable, friable, or loose.

The 2C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The texture ranges from loamy sand to silt loam in the fine-earth fraction. Consistence ranges from loose to friable.

Towerville Series

The Towerville series consists of moderately deep, moderately well drained, gently sloping to steep soils on valley sides and on other side slopes of upland plateaus. These soils formed in a thin mantle of glacial till underlain by siltstone and shale at a depth of 20 to 40 inches. Slopes range from 3 to 50 percent.

Towerville soils are in a drainage sequence that includes the somewhat poorly drained Orpark soils. They are associated with Hornell, Schuyler, Mardin, Chadakoin, and Fremont soils. They contain less clay than Hornell soils and are not so deep over bedrock as Schuyler soils. They do not have the fragipan that is typical of Mardin soils, have more clay in the subsoil than Chadakoin soils, and are better drained than Fremont soils.

Typical pedon of Towerville silt loam, 3 to 8 percent slopes; in the town of Cherry Creek; ¼ mile south of Weaver Road, 40 feet east of Davison Road:

Ap—0 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and medium granular structure; friable; many fine and common medium roots; about 5 percent channery fragments; strongly acid; abrupt smooth boundary.

Bw—12 to 22 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine and medium subangular blocky structure; very friable; many fine and common medium roots; common fine and few medium pores; about 15 percent channery fragments and 5 percent flagstones; strongly acid; abrupt smooth boundary.

BC—22 to 30 inches; brown (7.5YR 4/4) channery silt loam; many fine and medium distinct gray (5Y 6/1) and strong brown (7.5YR 5/6) mottles; very thick platy structure parting to weak medium and coarse angular blocky; firm, slightly sticky; few fine roots; few fine tubular and common fine vesicular pores; greenish gray (5GY 6/1) faces of peds; about 20 percent channery fragments and 5 percent flagstones; strongly acid; abrupt smooth boundary.

2R—30 inches; horizontally bedded siltstone.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The content of rock fragments consisting mainly of channery fragments and flagstones ranges, by volume, from 5 to 35 percent in the upper part of the solum and from 10 to 60 percent in the lower part of the solum and in the substratum.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. The texture is silt loam or loam in the fine-earth fraction. In areas that have not been limed, reaction ranges from very strongly acid to moderately acid.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The texture is silt loam, loam, or silty clay loam in the fine-earth fraction. Structure is weak or moderate, fine to coarse, subangular blocky. Consistence ranges from very friable to firm. Reaction ranges from very strongly acid to moderately acid.

The BC horizon or the C horizon, if it occurs, has hue of 5YR to 5Y, value of 4 to 6, and chroma of 1 to 6. The textures are similar to those of the B horizon but can include the very channery or very gravelly analogs of those textures. Structure is subangular blocky or platy in the BC horizon, but the C horizon is massive. Reaction ranges from strongly acid to slightly acid.

The R horizon is shale, siltstone, or sandstone that is horizontally bedded and commonly is interbedded.

Udifluvents

Udifluvents are deep, moderately well drained soils adjacent to perennial and intermittent streams. These soils are frequently flooded. They formed in recent alluvial deposits and show little or no horizon development. Slopes range from 0 to 3 percent.

Udifluvents are mapped with Fluvaquents. They are near Middlebury, Holderton, Teel, and Wayland soils and occur in areas where adjacent streams frequently

shift the soil deposits from place to place by scouring, cutting, and lateral erosion.

Because of the variability of Udifluvents, a typical pedon is not provided. The solum of these soils has an A horizon 1 inch to 5 inches thick. The depth to bedrock is more than 4 feet. Coarse fragments that include gravel, cobblestones, and flagstones make up 0 to 70 percent, by volume, of some horizons. The soils are very strongly acid to mildly alkaline. The content of organic matter decreases irregularly as depth increases.

The A horizon mainly has hue of 5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is quite variable. It is loamy sand to silt loam or the gravelly or very gravelly analogs of the textures within that range. In some areas the surface is stony.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 4. Some pedons are mottled. The texture is loamy sand to silt loam or the gravelly, cobbly, or very gravelly analogs of the textures within that range. Consistence is friable to loose.

Udorthents

Udorthents are deep, well drained to somewhat poorly drained soils that show little or no evidence of pedogenic horizons. They occur in areas that have been altered by filling and grading associated with landfills, housing developments, industrial sites, and other nonfarm uses. Slopes range from 0 to 35 percent.

Udorthents are in areas near urban developments and in some rural areas. They are on flood plains near Wayland and Teel soils, Aquents, and Saprists. They also are in areas of gravelly deposits, where the original soil material has been removed.

Because of the variability of Udorthents, a typical pedon is not provided. Udorthents have a solum that ranges from 0 to 10 inches in thickness. The depth to bedrock is more than 60 inches. The content of coarse fragments, including gravel and cobblestones, ranges from 0 to 65 percent in individual horizons. Reaction ranges from strongly acid to slightly acid.

The A horizon commonly has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4. It is loamy sand to silt loam or the gravelly or very gravelly analogs of the textures within that range.

The C horizon has hue of 5YR to 2.5Y, value of 3 to 6, and chroma of 3 or 4. It is loamy sand to silty clay or the gravelly or very gravelly analogs of the textures within that range. Trash and other debris commonly are mixed with the soil material in some areas.

Unadilla Series

The Unadilla series consists of very deep, well drained, nearly level to moderately steep soils on stream terraces and older alluvial fans. These soils formed in wind- and water-deposited silt and very fine sand. Slopes range from 0 to 25 percent.

Unadilla soils are in a drainage sequence that includes the moderately well drained Scio soils and the somewhat poorly drained Raynham soils. They are associated with Tioga, Pompton, Allard, and Chenango soils. They do not have the contrasting gravelly deposits that are typical of Allard soils. They do not have the gravelly coarse fragments that are associated with Chenango and Pompton soils, and they are better drained than Pompton soils. They contain more silt than Tioga soils, and they are in higher positions on terraces.

Typical pedon of Unadilla silt loam, 0 to 3 percent slopes; in the town of Ellington; ¾ mile east of Ellington on U.S Highway 62, 75 feet north of U.S Highway 62:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam; weak fine and medium granular structure; friable; many fine roots; less than 2 percent gravel; strongly acid; abrupt smooth boundary.

Bw1—10 to 22 inches; dark yellowish brown (10YR 5/6) silt loam; weak medium and fine subangular blocky structure; friable; many fine roots; less than 2 percent gravel; strongly acid; gradual smooth boundary.

Bw2—22 to 42 inches; dark yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine roots; less than 2 percent gravel; strongly acid; clear wavy boundary.

C1—42 to 50 inches; dark yellowish brown (10YR 4/4) silt loam; massive; friable; few fine roots; about 5 percent gravel; strongly acid; clear wavy boundary.

2C2—50 to 72 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam; massive; friable; about 40 percent gravel; strongly acid.

The thickness of the solum ranges from 20 to 50 inches. The depth to bedrock is more than 60 inches. The depth to contrasting material is more than 40 inches. The content of rock fragments ranges, by volume, from 0 to 5 percent in the solum and substratum and from 0 to 60 percent in the 2C horizon. Reaction ranges from very strongly acid to moderately acid in the surface layer and subsoil and from strongly acid to mildly alkaline in the substratum.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam or very fine sandy loam.

The Bw horizon has hue of 7.5YR to 2.5Y and value and chroma of 4 to 6. The texture is silt loam or very fine sandy loam. Structure is weak or moderate, subangular blocky or prismatic, or the material is massive. Consistence ranges from very friable to firm.

The C and 2C horizons have hue of 7.5YR to 5Y, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam or very fine sandy loam above a depth of 40 inches and ranges from fine sandy loam to very gravelly sand below this depth. The C horizon is massive or single grained, or it has weak, platy structure. Consistence ranges from loose to firm.

Valois Series

The Valois series consists of very deep, well drained, gently sloping to very steep soils on reglaciated outwash, lateral, and recessional moraines. These soils formed in ablated glacial till dominated by material derived from sandstone, siltstone, and shale. Slopes range from 3 to 50 percent.

Valois soils are associated with Chadakoin, Chautauqua, Chenango, Mardin, and Schuyler soils. They have less gravel in the subsoil than Chenango soils. They do not have the dense fragipan that is typical of Mardin soils, and they contain less clay and are better drained than Schuyler soils. They have more gravel in the substratum than Chadakoin and Chautauqua soils. Also, they are better drained than Chautauqua soils.

Typical pedon of Valois gravelly silt loam, 3 to 8 percent slopes; in the town of Ellington; 700 feet west of the intersection of U.S. Highway 62 and New York Route 83, 1,000 feet north of U.S. Highway 62:

Ap—0 to 6 inches; dark brown (10YR 4/3) gravelly silt loam; weak fine granular structure; friable; many fine roots; about 15 percent gravel; very strongly acid; abrupt smooth boundary.

Bw1—6 to 11 inches; yellowish brown (10YR 5/6) gravelly silt loam; weak fine and medium subangular blocky structure; friable; common fine roots; about 15 percent gravel; very strongly acid; clear wavy boundary.

Bw2—11 to 28 inches; yellowish brown (10YR 5/4) gravelly loam; weak fine subangular blocky or granular structure; friable; common fine roots; about 20 percent gravel; very strongly acid; clear wavy boundary.

Bw3—28 to 45 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak fine subangular blocky structure; friable; few fine roots; about 30 percent gravel; very strongly acid; clear wavy boundary.

2C1—45 to 48 inches; brown (10YR 4/3) very gravelly loamy sand; single grained; very friable; about 35 percent gravel; very strongly acid; clear wavy boundary.

2C2—48 to 72 inches; brown (10YR 4/3) very gravelly sandy loam; single grained; very friable; about 45 percent gravel; very strongly acid.

The thickness of the solum ranges from 30 to 70 inches. The depth to bedrock is more than 60 inches. The content of rock fragments ranges, by volume, from 15 to 35 percent in the surface layer and the upper part of the subsoil and from 20 to 35 percent in the lower part of the subsoil. Contrasting layers containing 35 to 70 percent rock fragments are common below a depth of 40 inches. Reaction ranges from extremely acid to moderately acid in the solum and from very strongly acid to neutral in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. The texture is silt loam, loam, or fine sandy loam in the fine-earth fraction.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. The texture is silt loam, loam, or fine sandy loam or the gravelly analogs of those textures. Structure is weak, fine or medium, granular or subangular blocky. Consistence is very friable or friable.

The 2C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam to sandy loam and loamy sand or the gravelly and very gravelly analogs of the textures within that range. It is single grained or massive. Consistence is firm, friable, or very friable.

Volusia Series

The Volusia series consists of very deep, somewhat poorly drained, nearly level to moderately steep soils on broad divides of dissected, glaciated upland plateaus. These soils formed in firm basal till dominated by material derived from siltstone, sandstone, and shale. Slopes range from 0 to 15 percent.

Volusia soils are in a drainage sequence that includes the moderately well drained Mardin soils. They are associated with Erie, Ashville, Fremont, and Orpark soils. They have a dense fragipan that is not present in the finer textured Fremont soils, and they contain less clay and are deeper over bedrock than Orpark soils. They have less clay and have lower reaction than Erie soils, and they are better drained than Ashville soils.

Typical pedon of Volusia channery silt loam, 3 to 8 percent slopes; in the town of Charlotte; ¼ mile north of the intersection of Cleland Road and Boutwell Hill Road, 300 feet west of Cleland Road:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) channery silt loam; moderate medium granular structure; friable; many fine roots; about 15 percent channery fragments; moderately acid; abrupt smooth boundary.

E—9 to 15 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; weak platy structure; friable; about 10 percent channery fragments; strongly acid; clear smooth boundary.

Bx—15 to 42 inches; brown (10YR 4/3) gravelly silt loam; common medium distinct yellowish brown (10YR 5/6) and gray (10YR 6/1) mottles; massive; firm, brittle; gray (10YR 6/1) silt coatings and common medium distinct yellowish brown (10YR 5/6) mottles between polygons; few faint thin clay films in pores; about 20 percent gravel; few roots between polygons; moderately acid; gradual wavy boundary.

Cd—42 to 72 inches; olive brown (2.5Y 4/4) gravelly silt loam; massive; firm; about 25 percent gravel; moderately acid.

The thickness of the solum ranges from 40 to 72 inches. The depth to bedrock is more than 60 inches. Depth to the top of the fragipan ranges from 10 to 16 inches. The content of coarse fragments ranges from 10 to 30 percent above the fragipan and from 20 to 50 percent in the fragipan and substratum. Reaction ranges from very strongly acid to slightly acid above the fragipan, from strongly acid to slightly acid in the fragipan, and from strongly acid to mildly alkaline in the substratum.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. The texture is loam or silt loam.

The E horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. The texture is loam or silt loam in the fine-earth fraction. Structure is weak or moderate, fine or medium, subangular blocky or weak, medium platy. Consistence is friable or firm.

The Bx horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 2 to 4. The texture is loam or silt loam in the fine-earth fraction. Consistence ranges from firm to extremely firm.

The Cd horizon has colors and textures similar to those of the Bx horizon. Structure is platy, or the material is massive. Consistence is firm or very firm.

Wakeville Series

The Wakeville series consists of very deep, somewhat poorly drained, nearly level soils on flood plains. These soils formed in deposits of recent silty alluvium. Slopes range from 0 to 3 percent.

Wakeville soils are in a drainage sequence that includes the well drained Hamlin soils, the moderately well drained Teel soils, and the poorly drained and very poorly drained Wayland soils. They are associated with Unadilla, Scio, Holderton, and Chenango soils. They have less sand and gravel than Holderton soils. They are wetter than Unadilla and Scio soils, which are on the higher terraces. They have less sand and gravel than Chenango soils and are less well drained.

Typical pedon of Wakeville silt loam; in the town of Kiantone; 500 feet west of the intersection of U.S. Highway 62 and New York Route 60, 50 feet south of New York Route 60:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bw—7 to 12 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

Bg1—12 to 26 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; grayish brown (10YR 5/2) faces of peds; weak fine and medium subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

Bg2—26 to 42 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and light brownish gray (10YR 6/2) mottles; light brownish gray (10YR 6/2) faces of peds; weak fine subangular blocky structure; friable; neutral; clear wavy boundary.

Cg—42 to 72 inches; grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/4) silt loam; massive; friable; mildly alkaline.

The thickness of the solum ranges from 24 to 45 inches. The content of rock fragments commonly is less than 2 percent throughout the profile. The depth to bedrock is more than 60 inches. Reaction ranges from moderately acid to neutral to a depth of 40 inches and from moderately acid to mildly alkaline below this depth.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The texture is silt loam or silt. Structure is weak, fine or medium, subangular blocky or granular. Consistence is friable or very friable.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4. The texture is silt loam to a depth of 40 inches and ranges from loam to fine sand below this depth. This horizon is massive or has platy structure. Consistence ranges from very friable to firm.

Wayland Series

The Wayland series consists of very deep, poorly drained and very poorly drained, nearly level soils that

formed in recent alluvium along major drainageways and their tributaries. These soils are in the lowest positions on flood plains, commonly in the slack-water areas farthest from the streams. Slopes range from 0 to 3 percent.

Wayland soils are in a drainage sequence that includes the somewhat poorly drained Wakeville soils, the moderately well drained Teel soils, and the well drained Hamlin soils. They are associated with Canandaigua, Halsey, Holderton, and Middlebury soils. They are wetter than Holderton and Middlebury soils and contain more clay in the subsoil. They do not have the sand and gravel content that is typical of Halsey soils, and they are frequently flooded, unlike the silty Canandaigua soils.

Typical pedon of Wayland silt loam; in the town of Kiantone; ¼ mile south of the intersection of U.S. Highway 62 and New York Route 60, ¼ mile east of U.S. Highway 62:

A—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam; yellowish brown (10YR 5/8) root stains; moderate fine and medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

Bg1—6 to 12 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bg2—12 to 18 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; slightly acid; clear wavy boundary.

Cg1—18 to 46 inches; gray (10YR 5/1) silt loam; common medium distinct strong brown (7.5YR 5/8) mottles; massive; friable; neutral; abrupt wavy boundary.

Cg2—46 to 72 inches; gray (5Y 6/1) silty clay loam; common medium distinct strong brown (10YR 5/8) mottles; massive; firm; mildly alkaline; slightly effervescent.

The thickness of the solum ranges from 10 to 30 inches. The content of rock fragments commonly is less than 2 percent throughout the profile. The depth to bedrock is more than 60 inches. Reaction ranges from moderately acid to mildly alkaline to a depth of 24 inches and from moderately acid to moderately alkaline below this depth.

The A horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2.

The Bg horizon has hue of 7.5YR to 5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. The texture is silt loam or silty clay loam. Structure is weak or moderate, fine or medium, subangular blocky, or it is weak or moderate, coarse prismatic. Consistence is friable or firm.

The C horizon has colors and textures similar to those of the B horizon. It is massive or has platy structure. Consistence is friable or firm.

Formation of the Soils

The first part of this section describes the factors of soil formation and relates them to the soils in the survey area. The second part defines the processes of horizon development as they relate to soil formation in the area.

Factors of Soil Formation

Soils are the product of weathering and other physical and chemical processes that act on parent material. The properties of a soil at a given point on the earth's surface depend on a combination of several factors of soil formation: parent material, relief, climate, plant and animal life, and time. The relative influence of each of these factors differs from place to place, and each factor modifies the effect of the others. For example, the impact of climate over a given area is tempered by the nature of the relief or of the parent material. In many areas the influence of a single factor is dominant.

Parent Material

Parent material is the unconsolidated earthy material in which soils form. It influences the physical, chemical, and mineralogical composition of the soils. It also influences the rate at which soil-forming processes take place.

Most of the soils in Chautauqua County formed in glacial deposits. Glacial till is the most extensive type of parent material in the survey area. Less extensive are deposits of glacial outwash, alluvium, lacustrine material, and organic material (figs. 17 and 18). A small number of unglaciated soils formed in residuum, or material weathered from the underlying interbedded shale, siltstone, and sandstone.

Table 19 shows the relationship between parent material, landscape position, and drainage class of the soils in Chautauqua County.

Soils that formed in glacial till exhibit a wide range of characteristics as a result of the heterogeneous nature of the till. Some soils that formed in very deep glacial till, such as Mardin and Volusia soils, have a dense substratum. Some soils that formed in very deep, coarser textured till, such as Chautauqua and Busti soils, do not have a dense layer. In some places the glacial till is moderately deep or shallow over bedrock. Hornell soils are moderately deep over shale and siltstone. Towerville and Orpark soils are moderately deep over interbedded siltstone, shale, and sandstone. Some areas have bedrock exposed at the surface.

As the glacial ice melted, large quantities of meltwater transported and sorted soil material and rock debris. This material, referred to as glacial outwash, was redeposited in layers of sand and gravel on outwash plains, kames, eskers, and valley terraces. The coarse textured Chenango and Colonie soils are examples of soils that formed in this material. Beach ridges along the borders of former glacial lakes were formed as a result of the sorting and depositing of soil particles by waves. Chenango soils formed in these medium to coarse textured deposits.

In more recent times, overflowing streams have deposited alluvial material on the flood plains. This material tends to be variable in texture. Examples of soils that formed in this material are Hamlin soils, which formed in moderately fine textured alluvium, and Tioga soils, which formed in coarse textured material.

At one time many of the larger valleys and the lake plain area in the northwestern part of Chautauqua County contained glacial lakes in which meltwater was trapped. The bulk of the stone-free sediment that was deposited from this meltwater was clayey or silty lacustrine material. Rhinebeck, Niagara, and Canandaigua soils formed in these fine textured or medium textured deposits.

An area a few square miles in size at elevations between 1,800 and 2,100 feet in the southeast corner of the county is mantled with unglaciated material. This material weathered from the underlying interbedded shale, siltstone, and sandstone. Ivory and Onoville soils formed in the mantle of unglaciated material.

Relief

The shape of the land surface, the slope, and the position of the land surface in relation to the water table have had a great influence on the formation of the soils in the survey area. Soils that formed in convex

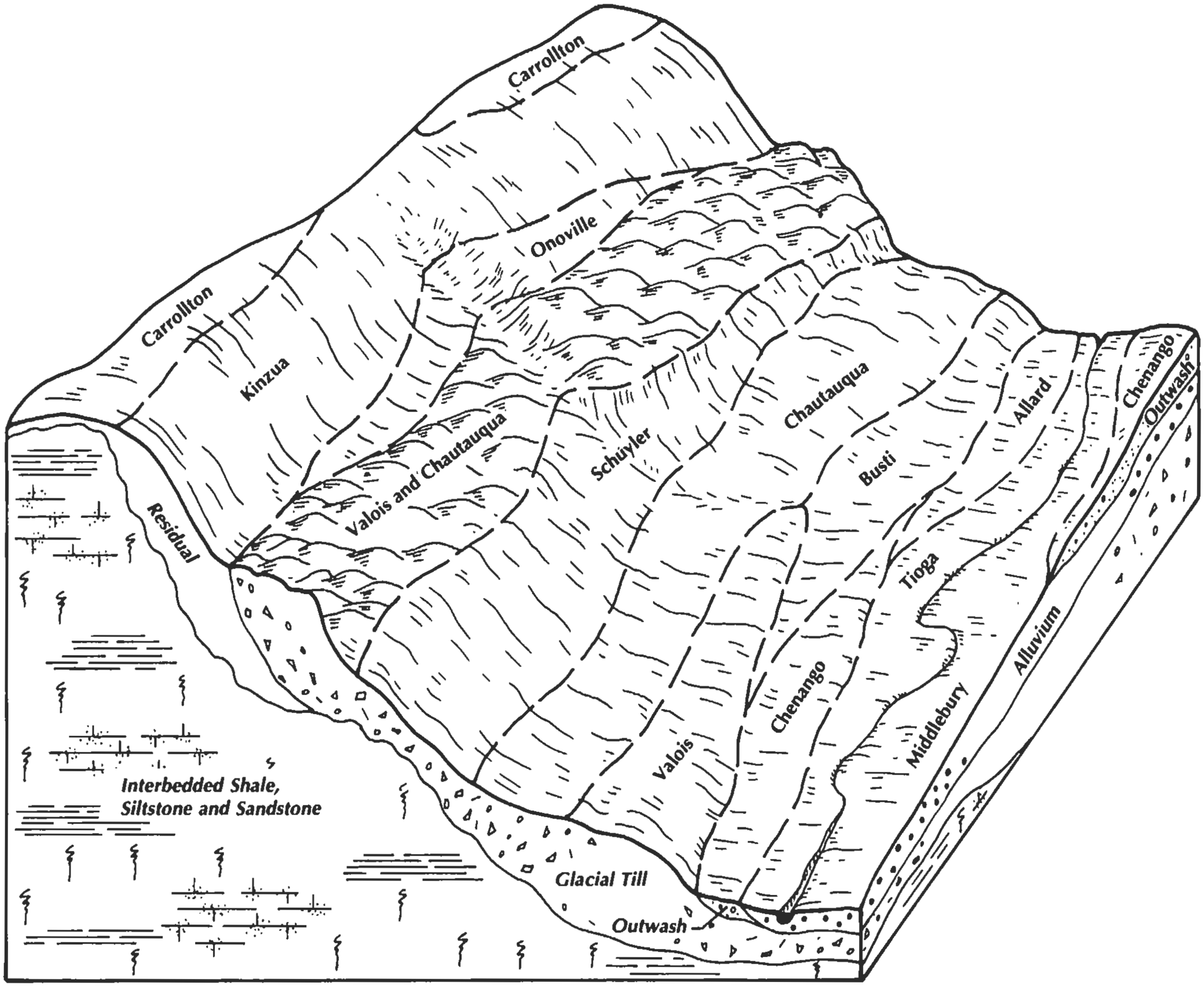

Figure 17.—Representative landscape showing soils that formed in residual material, glacial till, glacial outwash, or alluvium.

positions, where little or no runoff accumulates, commonly are well drained and do not have gray mottles in the subsoil. Valois and Chadakoin soils are examples. In level or slightly depressional areas, the water table usually is closer to the surface for extended periods. The wetness results in the formation of gray mottles close to the surface and commonly in the accumulation of sediment at the surface. Ashville soils are an example.

Climate

Climate is one of the most influential soil-forming factors. It determines to a large degree the kind of weathering processes that occur. It also affects the growth and kind of vegetation and the leaching and translocation of weathered material.

Chautauqua County has a humid, temperate climate that tends to promote the development of moderately weathered, leached soils. More detailed and specific data on the climate of Chautauqua County is provided in the section "General Nature of the County."

Plant and Animal Life

All living organisms, including plants, animals, bacteria, and fungi, influence soil formation. Vegetation generally is responsible for the amount of organic matter and nutrients in the soil and for the color and structure of the surface layer. Earthworms and

burrowing animals help to keep the soil porous and more permeable to air and water. Their waste products cause the aggregation of soil particles and improve soil structure. Bacteria and fungi decompose vegetation, which results in the release of nutrients.

The original vegetation in the survey area was native forest consisting of northern hardwoods and pines. The loss of nutrients through leaching is slow under hardwoods because the trees take up large quantities of nutrients and return much of them to the surface each year as leaf litter. Conifers, such as pines, do not use large amounts of nutrients; therefore, leaching is more rapid under them than it is under hardwoods.

In many of the soils on uplands, the rooting depth is shallow and the trees are susceptible to windthrow. As a result, the soil materials have been mixed.

Human activity, such as the clearing of trees and the cultivating of land, also has influenced the formation of

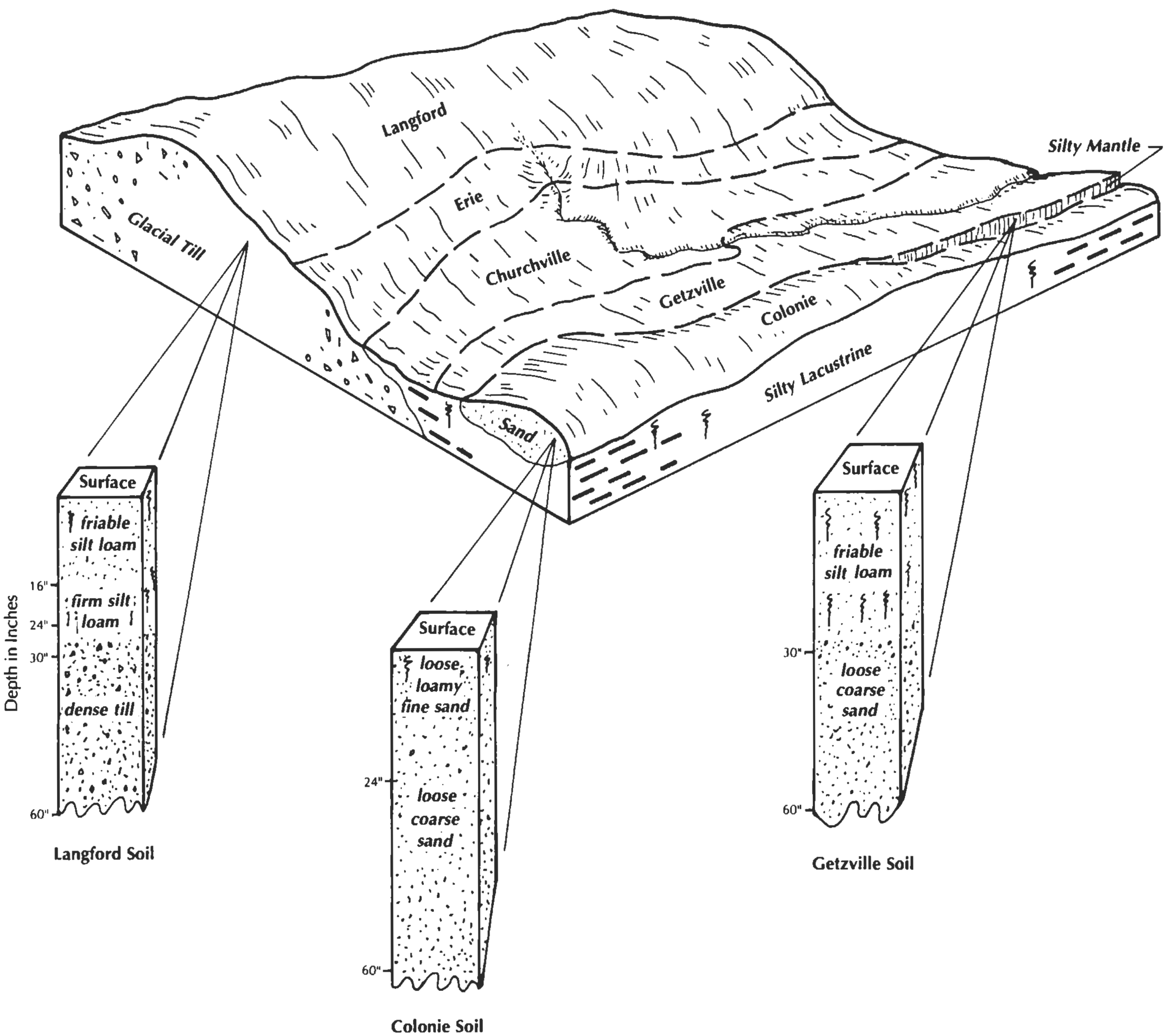

Figure 18.—Representative landscape showing the relationship of some important soils and their parent material. The exaggerated schematics represent some typical soil profiles.

the soils. Nutrients have been added as fertilizer is applied, some soil horizons have been mixed by plowing, and erosion has been accelerated in many areas.

Time

The degree of profile development reflects not only the age of a soil but also the influence of other factors. In geological terms, the deposits in which the soils in the survey area formed are relatively young, having been deposited when the last glacier receded about 10,000 to 15,000 years ago.

The soils have not all reached the same stage of soil profile development, because the other soil-forming factors also influence the rate of soil profile development. Since the time factor is constant within the county, differences in appearance and in the depth of the weathering have been mostly influenced by differences in parent material.

An immature soil is one that has not had enough time to develop distinct horizons. Fluvaquents are a good example. These soils formed in recent alluvium that is regularly being flooded and receiving more deposits of sediment. Because the time during which soil development can take place is constantly being interrupted, only thin or irregular soil profiles have developed.

Processes of Soil Formation

The soil-forming processes result in the development of distinct layers, or soil horizons. These horizons can be viewed in a vertical cut of soil, known as a soil profile. The soil profile extends from the surface downward into material that is little altered by the soil-forming processes. Most soils contain three major horizons, called A, B, and C horizons.

Several processes are involved in the formation of soil horizons. These processes include the accumulation of organic matter, the leaching of soluble salts and minerals, the translocation of clay minerals, the reduction and transfer of iron, and the formation of dense, compact layers in the subsoil *(4)*.

The accumulation of organic matter takes place as plant residue decomposes. This process darkens the surface layer and helps to form an A horizon. It takes a long time to replace this organic matter once it has been lost. The organic matter content of the surface layer of the soils in the survey area averages about 5 percent.

For soils to develop a distinct subsoil, some of the lime and other soluble salts must be leached before other soil processes, such as the translocation of clay minerals, can take place. Factors that affect leaching include the kinds of salts originally present, the rate and depth of percolation, and the texture of the soil.

One of the more important processes of horizon development in some of the soils is the translocation of silicate clay minerals. The amount of clay minerals in a soil is inherent in the nature of the parent material, but the content of clay varies from one soil horizon to another. Clay particles are transported (eluviated) downward from the A horizon and redeposited (illuviated) in the B horizon as clay films on the faces of peds, as linings along pores and root channels, and as coatings on some coarse fragments. Darien soils are an example of soils in which the content of clay is higher in the B horizon than in the A horizon because of translocation. In some soils an E horizon has formed below the A horizon as a result of considerable eluviation of clay minerals to the B horizon.

The reduction and transfer of iron compounds occur mainly in the wetter, more poorly drained soils. This process is known as gleying. In poorly drained and very poorly drained soils, such as those of the Alden series, the grayish color of the subsoil indicates that the reduction of iron has taken place. In moderately well drained and somewhat poorly drained soils, such as those of the Chautauqua and Busti series, yellowish brown and reddish brown mottles indicate the segregation of iron compounds. The presence of a bright-colored, unmottled subsoil indicates that the soils are well drained and that no reduction or transfer of iron has taken place. Valois soils, for example, are well drained and do not have mottles in the subsoil.

In some of the soils in Chautauqua County, a distinct fragipan has developed in the subsoil. The fragipan is very firm and brittle when moist and is very hard when dry. Its swelling and shrinking in alternating wet and dry periods may result in the dense packing of soil particles, the low pore space, and the gross polygonal pattern of vertical cracks that are characteristic of most fragipans *(4)*. Clay, silica, and oxides of aluminum are the cementing agents that cause brittleness and hardness. Erie, Langford, Mardin, and Volusia soils have a well expressed fragipan.

Many well drained and moderately well drained soils in the county, such as Chenango and Scio soils, have a strong brown, yellowish brown, or reddish brown subsoil. These colors are mainly caused by thin coatings of iron oxides on the sand and silt particles. The subsoil commonly has subangular blocky structure but contains little or no clay translocated from the surface layer.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	more than 5.2

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100

grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channery fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage and planting system in which crop residue covers at least 30 percent of the surface after planting. Where wind erosion is the main concern, the system leaves the equivalent of at least 1,000 pounds per acre of flat, small-grain residue on the surface during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Kettle (geology). A depression in the soil surface formed by the melting of an ice block buried in glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk

density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to Ca^{++} + Mg^{++}. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of

the substratum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of

coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-60 at Jamestown, New York)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	34.1	18.9	26.5	57	-5	7	3.06	1.99	4.03	11	19.9
February	36.9	20.4	28.7	63	-6	10	2.57	1.55	3.48	9	17.7
March	43.1	24.8	34.0	70	5	51	3.16	1.73	4.42	11	17.9
April	60.1	37.7	48.9	84	19	283	3.55	2.05	4.87	11	6.6
May	69.9	45.6	57.8	87	30	552	3.42	2.04	4.64	9	.1
June	79.1	54.6	66.9	94	39	807	3.79	1.98	5.37	8	.0
July	83.0	59.1	71.1	93	44	964	3.54	1.88	4.99	8	.0
August	81.3	57.7	69.5	92	42	915	2.82	1.45	4.00	8	.0
September	74.6	50.8	62.7	95	31	681	2.97	1.24	4.42	7	.0
October	64.0	42.0	53.0	84	26	403	3.44	1.03	5.40	7	.7
November	48.4	32.2	40.3	74	8	105	3.39	2.29	4.39	11	15.2
December	37.9	23.7	30.8	61	-1	38	3.29	2.54	3.98	11	23.0
Yearly:											
Average	59.4	39.0	49.2	---	---	---	---	---	---	---	---
Extreme	---	---	---	97	-7	---	---	---	---	---	---
Total	---	---	---	---	---	4,816	39.00	34.57	43.89	111	101.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-60 at Jamestown, New York)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 29	May 24	June 4
2 years in 10 later than--	Apr. 25	May 18	May 29
5 years in 10 later than--	Apr. 16	May 5	May 17
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 16	Sept. 27	Sept. 13
2 years in 10 earlier than--	Oct. 22	Oct. 4	Sept. 19
5 years in 10 earlier than--	Nov. 3	Oct. 16	Oct. 2

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-60 at Jamestown, New York)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	177	135	109
8 years in 10	185	145	118
5 years in 10	200	163	137
2 years in 10	214	181	155
1 year in 10	222	191	164

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Alden mucky silt loam	5,372	0.8
AlA	Allard silt loam, 0 to 3 percent slopes	4,041	0.6
AlB	Allard silt loam, 3 to 8 percent slopes	1,918	0.3
As	Ashville silt loam	11,736	1.7
BrA	Barcelona silt loam, 0 to 3 percent slopes	8,326	1.2
BrB	Barcelona silt loam, 3 to 8 percent slopes	2,716	0.4
BsA	Busti silt loam, 0 to 3 percent slopes	14,181	2.1
BsB	Busti silt loam, 3 to 8 percent slopes	89,905	13.2
BsC	Busti silt loam, 8 to 15 percent slopes	13,398	2.0
Ca	Canadice silty clay loam	1,329	0.2
Cb	Canandaigua silt loam, loamy substratum	12,022	1.8
Cc	Canandaigua mucky silt loam	5,026	0.7
CdB	Canaseraga silt loam, 3 to 8 percent slopes	801	0.1
CdC	Canaseraga silt loam, 8 to 15 percent slopes	459	0.1
Ce	Carlisle muck	2,045	0.3
CfC	Carrollton channery silt loam, 8 to 15 percent slopes	144	*
CfD	Carrollton channery silt loam, 15 to 25 percent slopes	137	*
ChB	Chadakoin silt loam, 3 to 8 percent slopes	2,896	0.4
ChC	Chadakoin silt loam, 8 to 15 percent slopes	5,302	0.8
ChD	Chadakoin silt loam, 15 to 25 percent slopes	6,947	1.0
ChE	Chadakoin silt loam, 25 to 35 percent slopes	6,503	1.0
ChF	Chadakoin silt loam, 35 to 50 percent slopes	3,423	0.5
CkB	Chautauqua silt loam, 3 to 8 percent slopes	44,348	6.5
CkC	Chautauqua silt loam, 8 to 15 percent slopes	33,693	5.0
CkD	Chautauqua silt loam, 15 to 25 percent slopes	6,177	0.9
ClA	Chenango silt loam, 0 to 3 percent slopes	1,154	0.2
ClB	Chenango silt loam, 3 to 8 percent slopes	396	0.1
CnA	Chenango gravelly loam, 0 to 3 percent slopes	12,867	1.9
CnB	Chenango gravelly loam, 3 to 8 percent slopes	11,752	1.7
CnC	Chenango gravelly loam, 8 to 15 percent slopes	2,344	0.3
CnD	Chenango gravelly loam, 15 to 25 percent slopes	353	0.1
CnE	Chenango gravelly loam, 25 to 40 percent slopes	265	*
CoA	Chenango channery loam, fan, 0 to 3 percent slopes	3,789	0.6
CoB	Chenango channery loam, fan, 3 to 8 percent slopes	6,044	0.9
CpA	Churchville silt loam, 0 to 3 percent slopes	330	*
CpB	Churchville silt loam, 3 to 8 percent slopes	1,144	0.2
CpC	Churchville silt loam, 8 to 15 percent slopes	528	0.1
CsB	Collamer silt loam, 3 to 8 percent slopes	676	0.1
CsC	Collamer silt loam, 8 to 15 percent slopes	528	0.1
CvB	Colonie loamy fine sand, 3 to 8 percent slopes	365	0.1
CvC	Colonie loamy fine sand, 8 to 15 percent slopes	181	*
DaA	Dalton silt loam, 0 to 3 percent slopes	2,389	0.4
DaB	Dalton silt loam, 3 to 8 percent slopes	1,945	0.3
DeA	Darien silt loam, 0 to 3 percent slopes	768	0.1
DeB	Darien silt loam, 3 to 8 percent slopes	2,354	0.3
DeC	Darien silt loam, 8 to 15 percent slopes	292	*
DkD	Dunkirk silt loam, 15 to 25 percent slopes	723	0.1
DkE	Dunkirk silt loam, 25 to 45 percent slopes	279	*
ElA	Elnora fine sandy loam, 0 to 3 percent slopes	1,148	0.2
ElB	Elnora fine sandy loam, 3 to 8 percent slopes	1,783	0.3
ErA	Erie silt loam, 0 to 3 percent slopes	2,060	0.3
ErB	Erie silt loam, 3 to 8 percent slopes	11,464	1.7
ErC	Erie silt loam, 8 to 15 percent slopes	1,071	0.2
Fe	Fluvaquents-Udifluvents complex, frequently flooded	8,539	1.3
FmA	Fremont silt loam, 0 to 3 percent slopes	13,668	2.0
FmB	Fremont silt loam, 3 to 8 percent slopes	59,159	8.7
FmC	Fremont silt loam, 8 to 15 percent slopes	14,619	2.1
FmD	Fremont silt loam, 15 to 25 percent slopes	713	0.1
FrB	Frewsburg silt loam, 3 to 8 percent slopes	440	0.1
FrC	Frewsburg silt loam, 8 to 15 percent slopes	287	*
Ge	Getzville silt loam	4,811	0.7
Ha	Halsey mucky silt loam	2,115	0.3
He	Hamlin silt loam	869	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Hm	Henrietta muck	974	0.1
HnA	Hinesburg fine sandy loam, 0 to 3 percent slopes	278	*
HnB	Hinesburg fine sandy loam, 3 to 8 percent slopes	380	0.1
HnC	Hinesburg fine sandy loam, 8 to 15 percent slopes	193	*
Ho	Holderton silt loam	3,716	0.5
HrA	Hornell silt loam, 0 to 3 percent slopes	3,346	0.5
HrB	Hornell silt loam, 3 to 8 percent slopes	6,079	0.9
HrC	Hornell silt loam, 8 to 15 percent slopes	2,302	0.3
HrD	Hornell silt loam, 15 to 25 percent slopes	917	0.1
IvB	Ivory silty clay loam, 3 to 8 percent slopes	158	*
KnE	Kinzua channery silt loam, 25 to 45 percent slopes	148	*
La	Lamson silt loam	3,679	0.5
LnB	Langford silt loam, 3 to 8 percent slopes	5,960	0.9
LnC	Langford silt loam, 8 to 15 percent slopes	4,044	0.6
MdB	Mardin channery silt loam, 3 to 8 percent slopes	1,015	0.1
MdC	Mardin channery silt loam, 8 to 15 percent slopes	1,511	0.2
MdD	Mardin channery silt loam, 15 to 25 percent slopes	687	0.1
Me	Middlebury silt loam	2,020	0.3
Mn	Minoa fine sandy loam	5,623	0.8
NgA	Niagara silt loam, 0 to 3 percent slopes, loamy substratum	18,379	2.7
NgB	Niagara silt loam, 3 to 8 percent slopes, loamy substratum	2,925	0.4
OnD	Onoville silt loam, 10 to 25 percent slopes	138	*
OrA	Orpark silt loam, 0 to 3 percent slopes	2,034	0.3
OrB	Orpark silt loam, 3 to 8 percent slopes	4,714	0.7
OrC	Orpark silt loam, 8 to 15 percent slopes	2,886	0.4
OrD	Orpark silt loam, 15 to 25 percent slopes	573	0.1
Pa	Palms muck	4,026	0.6
Pg	Pits, gravel	1,246	0.2
Po	Pompton silt loam	7,549	1.1
RaA	Raynham silt loam, 0 to 3 percent slopes	4,526	0.7
RaB	Raynham silt loam, 3 to 8 percent slopes	1,971	0.3
Rf	Raynham silt loam, flooded	3,125	0.5
Rh	Red Hook silt loam	8,403	1.2
RnA	Rhinebeck silt loam, 0 to 3 percent slopes	2,054	0.3
RoF	Rock outcrop-Manlius complex, 35 to 70 percent slopes	841	0.1
Sa	Saprists and Aquents, ponded	895	0.1
ShB	Schuyler silt loam, 3 to 8 percent slopes	9,566	1.4
ShC	Schuyler silt loam, 8 to 15 percent slopes	10,633	1.6
ShD	Schuyler silt loam, 15 to 25 percent slopes	8,105	1.2
ShE	Schuyler silt loam, 25 to 35 percent slopes	4,806	0.7
ShF	Schuyler silt loam, 35 to 50 percent slopes	2,042	0.3
SoA	Scio silt loam, 0 to 3 percent slopes	2,139	0.3
SoB	Scio silt loam, 3 to 8 percent slopes	731	0.1
Sw	Swormville silt loam	6,280	0.9
Te	Teel silt loam	1,539	0.2
Tg	Tioga silt loam	933	0.1
ToB	Towerville silt loam, 3 to 8 percent slopes	583	0.1
ToC	Towerville silt loam, 8 to 15 percent slopes	1,394	0.2
ToD	Towerville silt loam, 15 to 25 percent slopes	960	0.1
ToE	Towerville silt loam, 25 to 35 percent slopes	1,792	0.3
ToF	Towerville silt loam, 35 to 50 percent slopes	2,970	0.4
Ud	Udorthents, landfill	822	0.1
Ue	Udorthents, loamy-skeletal	396	0.1
UnA	Unadilla silt loam, 0 to 3 percent slopes	644	0.1
UnB	Unadilla silt loam, 3 to 8 percent slopes	603	0.1
UnC	Unadilla silt loam, 8 to 15 percent slopes	217	*
Ur	Urban land	685	0.1
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	11,013	1.6
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	7,964	1.2
VaD	Valois gravelly silt loam, 15 to 25 percent slopes	3,086	0.5
VaE	Valois gravelly silt loam, 25 to 35 percent slopes	1,193	0.2
VaF	Valois gravelly silt loam, 35 to 50 percent slopes	1,073	0.2
VcC	Valois gravelly silt loam, rolling	5,084	0.7

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
VoA	Volusia channery silt loam, 0 to 3 percent slopes	2,367	0.3
VoB	Volusia channery silt loam, 3 to 8 percent slopes	8,180	1.2
VoC	Volusia channery silt loam, 8 to 15 percent slopes	2,470	0.4
Wa	Wakeville silt loam	3,303	0.5
Wy	Wayland silt loam	7,020	1.0
	Water	3,035	0.4
	Total	680,000	100.0

* Less than 0.05 percent. The combined extent of the soils assigned an asterisk in the "Percent" column is about 0.4 percent of the survey area.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AlA	Allard silt loam, 0 to 3 percent slopes
AlB	Allard silt loam, 3 to 8 percent slopes
BrA	Barcelona silt loam, 0 to 3 percent slopes (where drained)
BrB	Barcelona silt loam, 3 to 8 percent slopes (where drained)
BsA	Busti silt loam, 0 to 3 percent slopes (where drained)
BsB	Busti silt loam, 3 to 8 percent slopes (where drained)
CdB	Canaseraga silt loam, 3 to 8 percent slopes
ChB	Chadakoin silt loam, 3 to 8 percent slopes
CkB	Chautauqua silt loam, 3 to 8 percent slopes
ClA	Chenango silt loam, 0 to 3 percent slopes
ClB	Chenango silt loam, 3 to 8 percent slopes
CnA	Chenango gravelly loam, 0 to 3 percent slopes
CnB	Chenango gravelly loam, 3 to 8 percent slopes
CoA	Chenango channery loam, fan, 0 to 3 percent slopes
CoB	Chenango channery loam, fan, 3 to 8 percent slopes
CsB	Collamer silt loam, 3 to 8 percent slopes
CvB	Colonie loamy fine sand, 3 to 8 percent slopes
DeA	Darien silt loam, 0 to 3 percent slopes (where drained)
DeB	Darien silt loam, 3 to 8 percent slopes (where drained)
ElA	Elnora fine sandy loam, 0 to 3 percent slopes
ElB	Elnora fine sandy loam, 3 to 8 percent slopes
ErA	Erie silt loam, 0 to 3 percent slopes (where drained)
ErB	Erie silt loam, 3 to 8 percent slopes (where drained)
FmA	Fremont silt loam, 0 to 3 percent slopes (where drained)
FmB	Fremont silt loam, 3 to 8 percent slopes (where drained)
FrB	Frewsburg silt loam, 3 to 8 percent slopes (where drained)
He	Hamlin silt loam
HnA	Hinesburg fine sandy loam, 0 to 3 percent slopes
HnB	Hinesburg fine sandy loam, 3 to 8 percent slopes
Ho	Holderton silt loam (where drained)
LnB	Langford silt loam, 3 to 8 percent slopes
Me	Middlebury silt loam
Mn	Minoa fine sandy loam (where drained)
NgA	Niagara silt loam, 0 to 3 percent slopes, loamy substratum (where drained)
NgB	Niagara silt loam, 3 to 8 percent slopes, loamy substratum (where drained)
OrA	Orpark silt loam, 0 to 3 percent slopes (where drained)
OrB	Orpark silt loam, 3 to 8 percent slopes (where drained)
Po	Pompton silt loam
RaA	Raynham silt loam, 0 to 3 percent slopes (where drained)
RaB	Raynham silt loam, 3 to 8 percent slopes (where drained)
Rf	Raynham silt loam, flooded (where drained)
Rh	Red Hook silt loam (where drained)
ShB	Schuyler silt loam, 3 to 8 percent slopes
SoA	Scio silt loam, 0 to 3 percent slopes
SoB	Scio silt loam, 3 to 8 percent slopes
Sw	Swormville silt loam (where drained)
Te	Teel silt loam
Tg	Tioga silt loam
ToB	Towerville silt loam, 3 to 8 percent slopes
UnA	Unadilla silt loam, 0 to 3 percent slopes
UnB	Unadilla silt loam, 3 to 8 percent slopes
VaB	Valois gravelly silt loam, 3 to 8 percent slopes
Wa	Wakeville silt loam (where drained)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
Ad-------------- Alden	IVw	---	---	---	---	---	---	---
AlA------------- Allard	I	120	24	90	5.5	4.0	3.5	8.5
AlB------------- Allard	IIe	115	23	90	5.5	4.0	3.5	8.5
As-------------- Ashville	IVw	---	---	---	---	2.0	---	3.0
BrA------------- Barcelona	IIIw	85	17	65	3.0	3.5	3.0	7.0
BrB------------- Barcelona	IIIw	90	18	65	3.0	3.5	3.0	7.0
BsA------------- Busti	IIIw	85	17	65	3.0	3.5	3.0	7.0
BsB------------- Busti	IIIw	90	18	70	3.0	3.5	3.0	7.0
BsC------------- Busti	IIIe	75	16	60	3.0	3.0	2.5	6.5
Ca-------------- Canadice	IVw	---	---	---	---	3.0	---	5.0
Cb-------------- Canandaigua	IVw	90	17	65	---	3.5	---	6.5
Cc-------------- Canandaigua	Vw	---	---	---	---	---	---	---
CdB------------- Canaseraga	IIe	90	18	70	4.0	3.5	3.0	7.0
CdC------------- Canaseraga	IIIe	85	17	65	4.0	---	---	6.0
Ce-------------- Carlisle	Vw	---	---	---	---	---	---	---
CfC------------- Carrollton	IIIe	75	15	55	3.5	3.5	3.0	7.0
CfD------------- Carrollton	IVe	65	13	45	---	---	---	6.0
ChB------------- Chadakoin	IIe	110	22	80	5.5	4.0	3.5	8.5
ChC------------- Chadakoin	IIIe	95	19	70	4.0	3.5	3.0	7.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
ChD------------- Chadakoin	IVe	80	16	60	3.5	3.0	3.0	6.5
ChE------------- Chadakoin	VIe	---	---	---	---	---	---	---
ChF------------- Chadakoin	VIIe	---	---	---	---	---	---	---
CkB------------- Chautauqua	IIw	100	19	70	4.0	3.5	3.0	7.5
CkC------------- Chautauqua	IIIe	90	18	65	4.0	3.5	3.0	7.5
CkD------------- Chautauqua	IVe	80	16	60	3.0	3.0	3.0	6.5
ClA------------- Chenango	I	110	22	80	5.5	4.0	3.5	8.0
ClB------------- Chenango	IIe	110	22	80	5.5	4.0	3.5	8.0
CnA------------- Chenango	IIs	105	21	80	5.0	4.0	3.5	8.0
CnB------------- Chenango	IIs	105	21	80	5.0	4.0	3.5	8.0
CnC------------- Chenango	IIIe	95	19	75	4.5	4.0	3.5	8.0
CnD------------- Chenango	IVe	75	14	60	4.0	3.5	3.5	7.0
CnE------------- Chenango	VIe	---	---	---	---	---	---	---
CoA------------- Chenango	IIs	100	20	80	5.0	4.0	3.5	8.0
CoB------------- Chenango	IIs	100	20	80	5.0	4.0	3.5	8.0
CpA, CpB-------- Churchville	IIIw	85	17	65	---	3.5	3.0	6.5
CpC------------- Churchville	IIIe	65	13	60	---	3.0	2.5	5.0
CsB------------- Collamer	IIe	110	22	80	5.0	4.0	3.5	8.0
CsC------------- Collamer	IIIe	100	20	75	4.5	4.0	3.0	7.0
CvB------------- Colonie	IIs	90	18	70	4.5	4.0	3.5	7.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
CvC------------- Colonie	IIIe	70	14	50	4.0	3.5	3.0	6.0
DaA, DaB-------- Dalton	IIIw	75	14	60	---	3.0	2.5	6.0
DeA------------- Darien	IIIw	90	18	65	3.0	3.0	3.0	6.5
DeB------------- Darien	IIIw	95	19	75	3.5	3.5	3.5	7.0
DeC------------- Darien	IIIe	80	16	65	3.0	3.5	3.0	6.5
DkD------------- Dunkirk	IVe	80	16	50	4.5	3.5	3.0	7.5
DkE------------- Dunkirk	VIIe	---	---	---	---	---	---	---
ElA------------- Elnora	IIw	85	17	70	3.5	3.0	3.0	6.5
ElB------------- Elnora	IIw	85	17	70	3.5	3.0	3.0	6.5
ErA------------- Erie	IIIw	80	16	65	---	3.0	3.0	6.5
ErB------------- Erie	IIIw	85	17	65	---	3.5	3.5	6.5
ErC------------- Erie	IIIe	75	15	60	---	3.5	2.5	6.5
Fe. Fluvaquents- Udifluvents								
FmA------------- Fremont	IIIw	70	14	65	---	3.0	3.0	6.5
FmB------------- Fremont	IIIw	75	15	65	---	3.5	3.0	6.5
FmC------------- Fremont	IIIe	65	13	65	---	3.5	2.5	6.0
FmD------------- Fremont	IVe	60	12	60	---	3.5	2.5	5.5
FrB------------- Frewsburg	IIIw	70	14	60	---	3.0	3.0	5.0
FrC------------- Frewsburg	IIIe	60	12	55	---	3.0	2.5	5.0
Ge-------------- Getzville	IVw	70	14	55	---	3.0	2.5	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
Ha------------- Halsey	Vw	---	---	---	---	---	---	---
He------------- Hamlin	I	120	24	90	5.5	4.0	3.5	8.5
Hm------------- Henrietta	Vw	---	---	---	---	---	---	---
HnA, HnB-------- Hinesburg	IIs	110	22	80	5.0	4.0	3.5	8.5
HnC------------ Hinesburg	IIIe	85	17	65	4.0	3.5	3.5	7.5
Ho------------- Holderton	IIIw	80	16	50	3.0	3.5	3.0	7.5
HrA, HrB-------- Hornell	IIIw	75	15	65	---	3.0	2.5	6.0
HrC------------ Hornell	IIIe	65	13	65	---	3.0	2.5	6.0
HrD------------ Hornell	IVe	60	12	60	---	3.0	2.5	5.5
IvB------------ Ivory	IIIw	65	13	60	---	3.0	2.5	6.0
KnE------------ Kinzua	VIIe	---	---	---	---	---	---	---
La------------- Lamson	Vw	---	---	---	---	---	---	---
LnB------------ Langford	IIw	95	18	70	4.0	3.5	3.5	7.5
LnC------------ Langford	IIIe	85	17	65	4.0	3.5	3.5	7.5
MdB------------ Mardin	IIw	90	17	70	4.0	3.5	3.5	7.5
MdC------------ Mardin	IIIe	80	16	65	4.0	3.5	3.5	7.5
MdD------------ Mardin	IVe	70	14	65	3.0	3.0	3.0	6.5
Me------------- Middlebury	IIw	115	23	80	4.5	4.0	3.5	7.5
Mn------------- Minoa	IIIw	90	18	70	---	3.5	3.0	6.5
NgA------------ Niagara	IIIw	95	19	75	3.5	3.5	3.5	7.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
NgB------------- Niagara	IIIw	100	20	75	4.0	3.5	3.5	7.5
OnD------------- Onoville	IVe	70	14	45	3.5	---	---	5.5
OrA------------- Orpark	IIIw	70	14	60	---	3.0	2.5	6.0
OrB------------- Orpark	IIIw	75	15	65	---	3.5	3.0	6.5
OrC------------- Orpark	IIIe	70	14	60	---	3.0	2.5	5.5
OrD------------- Orpark	IVe	60	12	55	---	3.0	2.5	5.5
Pa-------------- Palms	Vw	---	---	---	---	---	---	---
Pg**. Pits								
Po-------------- Pompton	IIw	110	22	80	4.5	4.0	3.5	7.5
RaA, RaB-------- Raynham	IIIw	90	18	70	---	4.0	3.0	7.0
Rf-------------- Raynham	IIIw	85	17	65	---	4.0	3.0	6.5
Rh-------------- Red Hook	IIIw	95	19	75	3.5	3.5	3.5	7.0
RnA------------- Rhinebeck	IIIw	85	17	65	3.0	3.5	3.0	7.0
RoF------------- Rock outcrop-Manlius	VIIIs	---	---	---	---	---	---	---
Sa-------------- Saprists and Aquents	VIIIw	---	---	---	---	---	---	---
ShB------------- Schuyler	IIw	90	17	70	4.0	3.5	3.5	7.5
ShC------------- Schuyler	IIIe	85	17	65	3.5	3.5	3.0	7.5
ShD------------- Schuyler	IVe	80	16	60	3.0	3.0	3.0	6.5
ShE------------- Schuyler	VIe	---	---	---	---	---	---	6.0
ShF------------- Schuyler	VIIe	---	---	---	---	---	---	5.0

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
SoA-------------- Scio	IIw	105	21	80	4.5	4.0	3.5	8.0
SoB-------------- Scio	IIe	110	22	85	5.0	4.0	3.5	8.0
Sw--------------- Swormville	IIIw	90	18	65	---	4.0	3.0	7.0
Te--------------- Teel	IIw	115	23	80	4.5	4.0	3.5	7.5
Tg--------------- Tioga	I	120	24	90	5.5	4.0	3.5	8.5
ToB-------------- Towerville	IIe	85	17	70	3.5	3.5	3.0	7.0
ToC-------------- Towerville	IIIe	80	16	65	3.5	3.5	3.0	7.0
ToD-------------- Towerville	IVe	75	15	60	3.0	3.0	3.0	6.5
ToE-------------- Towerville	VIe	---	---	---	---	---	---	5.5
ToF-------------- Towerville	VIIe	---	---	---	---	---	---	4.5
Ud, Ue. Udorthents								
UnA-------------- Unadilla	I	110	22	85	5.5	4.0	3.5	8.5
UnB-------------- Unadilla	IIe	110	22	85	5.5	4.0	3.5	8.5
UnC-------------- Unadilla	IIIe	95	19	75	4.5	4.0	3.5	7.5
Ur**------------- Urban land	VIIIs	---	---	---	---	---	---	---
VaB-------------- Valois	IIe	110	22	80	5.5	4.0	3.5	8.0
VaC-------------- Valois	IIIe	95	19	75	4.5	4.0	3.5	7.5
VaD-------------- Valois	IVe	85	17	70	3.5	3.5	3.0	7.0
VaE-------------- Valois	VIe	---	---	---	---	---	---	---
VaF-------------- Valois	VIIe	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Corn silage	Oats	Alfalfa hay	Grass hay	Trefoil-grass hay	Pasture
		Bu	Tons	Bu	Tons	Tons	Tons	AUM*
VcC------------- Valois	IIIe	95	19	75	4.5	4.0	3.5	7.5
VoA------------- Volusia	IIIw	75	15	65	---	3.0	3.0	6.0
VoB------------- Volusia	IIIw	80	16	65	---	3.5	3.0	6.0
VoC------------- Volusia	IIIe	70	14	60	---	3.5	2.5	5.5
Wa-------------- Wakeville	IIIw	85	17	45	3.0	3.5	3.0	6.5
Wy-------------- Wayland	Vw	---	---	---	---	---	---	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	7,641	---	---	---
II	132,159	19,617	77,067	35,475
III	409,289	111,257	298,032	---
IV	52,698	29,450	23,248	---
V	36,907	---	36,907	---
VI	14,912	14,912	---	---
VII	10,305	10,305	---	---
VIII	2,401	---	---	2,401

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Management concerns: Equip- ment limita- tion	Management concerns: Seedling mortal- ity	Management concerns: Wind- throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc- tivity class*	Trees to plant
Ad-------------- Alden	2W	Slight	Severe	Severe	Severe	Red maple-----------	50	2	White spruce, northern whitecedar.
AlA, AlB-------- Allard	3A	Slight	Slight	Slight	Slight	Sugar maple---------	63	3	Eastern white pine, Norway spruce, European larch, red pine.
						White ash-----------	76	3	
						Northern red oak----	70	4	
						Black cherry--------	70	3	
						American beech------	---	---	
						Eastern white pine--	75	10	
						Eastern hemlock-----	---	---	
As-------------- Ashville	2W	Slight	Severe	Moderate	Moderate	Red maple-----------	55	2	White spruce, northern whitecedar, eastern white pine.
						Northern whitecedar-	---	---	
						Sugar maple---------	60	3	
BrA, BrB-------- Barcelona	3W	Slight	Moderate	Moderate	Moderate	Sugar maple---------	70	3	Eastern white pine, white spruce, Norway spruce.
						Red maple-----------	---	---	
						American beech------	---	---	
						White ash-----------	---	---	
BsA, BsB, BsC--- Busti	3W	Slight	Moderate	Moderate	Moderate	Sugar maple---------	60	3	Eastern white pine, white spruce, Norway spruce, European larch.
						Northern red oak----	65	3	
						White ash-----------	---	---	
						Black cherry--------	---	---	
Ca-------------- Canadice	2W	Slight	Severe	Severe	Moderate	Red maple-----------	50	2	Eastern white pine, white spruce.
						Eastern white pine--	55	6	
Cb, Cc---------- Canandaigua	3W	Slight	Severe	Severe	Severe	Red maple-----------	65	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
CdB------------- Canaseraga	10A	Slight	Slight	Slight	Slight	Eastern white pine--	85	10	Sugar maple, red maple, American basswood, white oak, white ash, American beech, black cherry, eastern white pine.
						White ash-----------	84	4	
						Red pine------------	85	8	
						White spruce--------	75	10	
						Sugar maple---------	71	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
CdC------------- Canaseraga	10R	Moderate	Slight	Slight	Slight	Eastern white pine--	85	10	Sugar maple, red maple, American basswood, white oak, white ash, American beech, black cherry, eastern white pine.
						White ash-----------	84	4	
						Red pine------------	85	8	
						White spruce--------	75	10	
						Sugar maple---------	71	3	
Ce-------------- Carlisle	2W	Slight	Severe	Severe	Severe	Red maple-----------	56	2	---
						White ash-----------	---	---	
						Green ash-----------	---	---	
						Quaking aspen-------	---	---	
						Swamp white oak-----	---	---	
						Silver maple--------	82	2	
CfC------------- Carrollton	3A	Slight	Slight	Slight	Slight	Northern red oak----	75	3	Red pine, white spruce, eastern white pine, larch.
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						American beech------	---	---	
CfD------------- Carrollton	3R	Moderate	Moderate	Slight	Slight	Northern red oak----	75	3	Red pine, white spruce, eastern white pine, larch.
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						American beech------	---	---	
ChB, ChC-------- Chadakoin	3D	Slight	Slight	Slight	Slight	Northern red oak----	70	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Sugar maple---------	60	3	
						Black cherry--------	70	3	
						White ash-----------	70	3	
ChD, ChE-------- Chadakoin	3R	Slight	Moderate	Slight	Slight	Northern red oak----	70	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Sugar maple---------	60	3	
						Black cherry--------	70	3	
						White ash-----------	70	3	
ChF------------- Chadakoin	3R	Moderate	Severe	Slight	Slight	Northern red oak----	70	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Sugar maple---------	60	3	
						Black cherry--------	70	3	
						White ash-----------	70	3	
CkB, CkC-------- Chautauqua	3A	Slight	Slight	Slight	Slight	Sugar maple---------	65	3	Eastern white pine, Norway spruce, white spruce, European larch, red pine.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
						White ash-----------	70	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
CkD------------- Chautauqua	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash-----------	65 70 70 70	3 4 3 3	Eastern white pine, Norway spruce, white spruce, European larch, red pine.
ClA, ClB, CnA, CnB, CnC------- Chenango	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak----	70 80	3 4	Eastern white pine, red pine, European larch.
CnD, CnE-------- Chenango	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak----	70 80	3 4	Eastern white pine, red pine, European larch.
CoA, CoB-------- Chenango	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak----	70 80	3 4	Eastern white pine, Norway spruce.
CpA, CpB-------- Churchville	3W	Slight	Moderate	Slight	Moderate	Sugar maple--------- Eastern white pine-- Northern red oak----	60 75 70	3 10 4	Eastern white pine, Norway spruce.
CpC------------- Churchville	3W	Moderate	Moderate	Slight	Moderate	Sugar maple--------- Eastern white pine-- Northern red oak----	60 75 70	3 10 4	Eastern white pine, Norway spruce.
CsB------------- Collamer	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Black cherry-------- White ash----------- Northern red oak---- American basswood---	70 80 85 80 75	3 4 4 4 3	Eastern white pine, Norway spruce, white spruce, European larch.
CsC------------- Collamer	3R	Moderate	Slight	Slight	Slight	Sugar maple--------- Black cherry-------- White ash----------- Northern red oak---- American basswood---	70 80 85 80 75	3 4 4 4 3	Eastern white pine, Norway spruce, white spruce, European larch.
CvB, CvC-------- Colonie	3S	Slight	Slight	Severe	Slight	Northern red oak---- Sugar maple--------- White oak----------- Black oak----------- Red pine------------	60 55 60 60 65	3 2 3 3 8	Eastern white pine, European larch, red pine.
DaA, DaB-------- Dalton	3W	Slight	Moderate	Moderate	Moderate	Sugar maple--------- Northern red oak----	65 70	3 4	White spruce, eastern white pine, Norway spruce.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi- nation symbol	Management concerns: Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Potential productivity: Common trees	Site index	Produc- tivity class*	Trees to plant
DeA, DeB, DeC--- Darien	4W	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	4	Eastern white pine, European larch, Norway spruce, white spruce.
						Sugar maple---------	60	3	
DkD------------- Dunkirk	3R	Severe	Moderate	Slight	Slight	American basswood---	70	3	Norway spruce, European larch, red pine, white spruce.
						White ash-----------	---	---	
						Northern red oak----	---	---	
						American beech------	---	---	
DkE------------- Dunkirk	3R	Severe	Severe	Slight	Slight	American basswood---	70	3	Norway spruce, European larch, red pine, white spruce.
						White ash-----------	---	---	
						Northern red oak----	---	---	
						American beech------	---	---	
ElA, ElB-------- Elnora	3S	Slight	Slight	Severe	Slight	Northern red oak----	60	3	Eastern white pine, Norway spruce.
						Eastern white pine--	65	8	
						Sugar maple---------	55	2	
ErA, ErB, ErC--- Erie	3W	Slight	Moderate	Moderate	Moderate	Sugar maple---------	64	3	Eastern white pine, Norway spruce, white spruce.
						Black cherry--------	65	3	
						Northern red oak----	70	4	
						White ash-----------	75	3	
FmA, FmB, FmC--- Fremont	3W	Slight	Moderate	Moderate	Moderate	Sugar maple---------	65	3	Eastern white pine, European larch, Norway spruce, white spruce.
						Northern red oak----	65	3	
						American basswood---	---	---	
						White ash-----------	75	3	
						Red maple-----------	70	3	
FmD------------- Fremont	3R	Moderate	Moderate	Moderate	Moderate	Sugar maple---------	65	3	Eastern white pine, European larch, Norway spruce, white spruce.
						Northern red oak----	65	3	
						American basswood---	---	---	
						White ash-----------	75	3	
						Red maple-----------	70	3	
FrB, FrC-------- Frewsburg	3W	Slight	Moderate	Slight	Slight	Northern red oak----	70	3	Norway spruce, white spruce, eastern white pine, Japanese larch, idahybrid poplar.
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						Eastern hemlock-----	---	---	
						Eastern white pine--	---	---	
Ge-------------- Getzville	3W	Slight	Severe	Severe	Severe	Red maple-----------	65	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
Ha-------------- Halsey	2W	Slight	Severe	Severe	Severe	Red maple-----------	55	2	Eastern white pine, white spruce.
						White oak-----------	---	---	
						Swamp white oak-----	---	---	
						American beech------	---	---	
						River birch---------	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
He------------- Hamlin	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	4	Eastern white pine, black locust, Norway spruce, black walnut, European larch.
						Sugar maple---------	70	3	
Hm------------- Henrietta	2W	Slight	Severe	Severe	Severe	White ash-----------	56	2	Eastern cottonwood, red maple, Austrian pine, Scotch pine, black spruce, northern whitecedar.
						Red maple-----------	56	2	
						Yellow birch--------	54	2	
						American basswood---	56	2	
						Tamarack------------	49	3	
						Northern whitecedar-	---	---	
						Swamp white oak-----	---	---	
						Pin oak-------------	---	---	
						Green ash-----------	---	---	
HnA, HnB, HnC--- Hinesburg	8A	Slight	Slight	Moderate	Slight	Eastern white pine--	65	8	Eastern white pine, red pine.
						Northern red oak----	60	3	
Ho------------- Holderton	3W	Slight	Moderate	Moderate	Moderate	Red maple-----------	70	3	Norway spruce, white spruce, eastern white pine, European larch.
						Eastern hemlock-----	70	---	
HrA, HrB-------- Hornell	3W	Slight	Moderate	Moderate	Slight	Sugar maple---------	60	3	Eastern white pine, European larch, white spruce, Norway spruce.
						White ash-----------	70	3	
						Northern red oak----	70	4	
HrC------------- Hornell	3W	Moderate	Moderate	Moderate	Slight	Sugar maple---------	60	3	Eastern white pine, European larch, white spruce, Norway spruce.
						White ash-----------	70	3	
						Northern red oak----	70	4	
HrD------------- Hornell	3R	Severe	Severe	Moderate	Slight	Sugar maple---------	60	3	Eastern white pine, European larch, white spruce, Norway spruce.
						White ash-----------	70	3	
						Northern red oak----	70	4	
IvB------------- Ivory	3W	Moderate	Moderate	Moderate	Moderate	Northern red oak----	70	3	Norway spruce, white spruce, eastern white pine, idahybrid poplar.
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						American beech------	---	---	
						Eastern hemlock-----	---	---	
						Eastern white pine--	---	---	
KnE------------- Kinzua	4R	Moderate	Severe	Slight	Slight	Northern red oak----	80	4	Red pine, eastern white pine, European larch.
						Sugar maple---------	---	---	
						American beech------	---	---	
						Eastern white pine--	---	---	
						White oak-----------	---	---	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
La-------------- Lamson	8W	Slight	Severe	Severe	Severe	Eastern white pine-- Red maple----------- Pin oak------------- Swamp white oak-----	65 65 60 ---	8 3 3 ---	Northern whitecedar, eastern white pine.
LnB, LnC-------- Langford	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- American beech------ White ash----------- Eastern white pine-- Eastern hemlock-----	60 65 75 --- 70 75 ---	3 3 3 --- 3 10 ---	Red pine, European larch, Norway spruce, eastern white pine, white spruce.
MdB, MdC-------- Mardin	3A	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash-----------	60 63 70 70	3 3 3 3	Red pine, European larch, Norway spruce, eastern white pine, white spruce.
MdD------------- Mardin	3R	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- White ash-----------	60 63 70 70	3 3 3 3	Red pine, European larch, Norway spruce, eastern white pine, white spruce.
Me-------------- Middlebury	4A	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- Yellow-poplar-------	80 70 85	4 3 6	Eastern white pine, yellow-poplar, Norway spruce, European larch, black walnut, black cherry.
Mn-------------- Minoa	3W	Slight	Moderate	Moderate	Moderate	Sugar maple--------- White ash----------- Northern red oak---- Eastern hemlock-----	60 69 70 65	3 3 4 ---	Eastern white pine, Norway spruce, European larch, white spruce.
NgA, NgB-------- Niagara	3W	Slight	Moderate	Moderate	Moderate	Sugar maple--------- Northern red oak---- White ash----------- Black cherry--------	65 70 75 70	3 4 3 3	Eastern white pine, white spruce, Norway spruce.
OnD------------- Onoville	3R	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple--------- White oak----------- American beech------	75 --- --- ---	3 --- --- ---	Norway spruce, white spruce, eastern white pine, larch.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Management concerns: Equip-ment limita-tion	Management concerns: Seedling mortal-ity	Management concerns: Wind-throw hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Produc-tivity class*	Trees to plant
OrA, OrB, OrC--- Orpark	4W	Slight	Moderate	Moderate	Slight	Northern red oak---- Sugar maple---------	70 60	4 3	Eastern white pine, Norway spruce, white spruce, European larch.
OrD------------- Orpark	4W	Moderate	Moderate	Moderate	Slight	Northern red oak---- Sugar maple---------	70 60	4 3	Eastern white pine, Norway spruce, white spruce, European larch.
Pa-------------- Palms	2W	Slight	Severe	Severe	Severe	Red maple----------- Silver maple-------- White ash----------- Quaking aspen------- Northern whitecedar- Tamarack------------ Black ash-----------	55 80 --- --- --- --- ---	2 2 --- --- --- --- ---	---
Po-------------- Pompton	4W	Slight	Moderate	Moderate	Moderate	Pin oak------------- White ash----------- White oak-----------	75 --- ---	4 --- ---	Eastern white pine, red pine, European larch.
RaA, RaB-------- Raynham	3W	Slight	Severe	Moderate	Severe	Red maple----------- Eastern white pine-- White spruce-------- Red spruce---------- Elm----------------- Eastern hemlock----- Gray birch---------- Sugar maple--------- Balsam fir---------- Tamarack------------	65 65 55 45 --- --- --- --- --- ---	3 8 9 7 --- --- --- --- --- ---	Eastern white pine, white spruce.
Rf-------------- Raynham	3W	Slight	Severe	Severe	Severe	Red maple----------- Eastern white pine-- Red spruce---------- Red maple-----------	68 65 45 ---	3 8 7 ---	Eastern white pine, white spruce, northern whitecedar.
Rh-------------- Red Hook	3W	Slight	Moderate	Moderate	Moderate	Red maple----------- Eastern white pine--	70 70	3 9	Eastern white pine, Norway spruce.
RnA------------- Rhinebeck	3W	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak---- Eastern white pine-- Red maple-----------	65 70 75 70	3 4 10 3	Eastern white pine, Norway spruce, European larch, white spruce.
RoF**: Rock outcrop.									

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
RoF**:									
Manlius	4R	Moderate	Severe	Slight	Slight	Northern red oak	70	4	Eastern white pine, red pine, black cherry, Norway spruce, European larch.
						Black cherry	70	3	
						Sugar maple	70	3	
ShB, ShC Schuyler	3A	Slight	Slight	Slight	Slight	Sugar maple	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	4	
						Black cherry	70	3	
ShD, ShE Schuyler	3R	Moderate	Moderate	Slight	Slight	Sugar maple	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	4	
						Black cherry	70	3	
ShF Schuyler	3R	Severe	Severe	Slight	Slight	Sugar maple	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	4	
						Black cherry	70	3	
SoA, SoB Scio	4A	Slight	Slight	Slight	Slight	Northern red oak	75	4	European larch, eastern white pine, red pine, Norway spruce, white spruce.
						White ash	85	4	
						Sugar maple	70	3	
						Black cherry	80	4	
						Eastern hemlock	70	---	
						Eastern white pine	85	10	
Sw Swormville	3W	Slight	Moderate	Moderate	Moderate	Sugar maple	65	3	Eastern white pine, white spruce, Norway spruce.
						White ash	75	3	
						Northern red oak	70	4	
Te Teel	3A	Slight	Slight	Slight	Slight	Sugar maple	70	3	Eastern white pine, Norway spruce, black walnut, European larch.
						White ash	85	4	
Tg Tioga	4A	Slight	Slight	Slight	Slight	Northern red oak	75	4	Eastern white pine, yellow-poplar, Norway spruce, black walnut, European larch.
						Yellow-poplar	85	6	
						Sugar maple	67	3	
ToB, ToC Towerville	3A	Slight	Slight	Slight	Slight	Sugar maple	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	4	
						Black cherry	70	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
ToD, ToE-------- Towerville	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
ToF------------- Towerville	3R	Moderate	Moderate	Slight	Slight	Sugar maple---------	63	3	Eastern white pine, Norway spruce, European larch.
						Northern red oak----	70	4	
						Black cherry--------	70	3	
UnA, UnB-------- Unadilla	3A	Slight	Slight	Slight	Slight	Sugar maple---------	70	3	Eastern white pine, Norway spruce, black cherry, European larch, red pine, white spruce.
						Eastern white pine--	85	10	
						Northern red oak----	80	4	
						Black cherry--------	80	4	
						White ash-----------	95	4	
UnC------------- Unadilla	3R	Moderate	Slight	Slight	Slight	Sugar maple---------	70	3	Eastern white pine, Norway spruce, black cherry, European larch, red pine, white spruce.
						Eastern white pine--	85	10	
						Northern red oak----	80	4	
						Black cherry--------	80	4	
						White ash-----------	95	4	
VaB, VaC-------- Valois	3A	Slight	Slight	Slight	Slight	Sugar maple---------	61	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak----	70	4	
						White ash-----------	70	3	
						American basswood---	70	3	
VaD, VaE-------- Valois	3R	Slight	Moderate	Slight	Slight	Sugar maple---------	61	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak----	70	4	
						White ash-----------	70	3	
						American basswood---	70	3	
VaF------------- Valois	3R	Moderate	Severe	Slight	Slight	Sugar maple---------	61	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak----	70	4	
						White ash-----------	70	3	
						American basswood---	70	3	
VcC------------- Valois	3A	Slight	Slight	Slight	Slight	Sugar maple---------	61	3	Eastern white pine, white spruce, Norway spruce, red pine, European larch.
						Northern red oak----	70	4	
						White ash-----------	70	3	
						American basswood---	70	3	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
VoA, VoB, VoC---Volusia	4W	Slight	Moderate	Moderate	Moderate	Northern red oak----	70	4	Eastern white pine, Norway spruce, European larch, white spruce, black cherry.
						Sugar maple---------	64	3	
						White ash-----------	75	3	
Wa--------------Wakeville	3W	Slight	Moderate	Moderate	Moderate	Red maple-----------	70	3	Norway spruce, white spruce, eastern white pine, European larch.
						Eastern hemlock-----	70	---	
Wy--------------Wayland	3W	Slight	Severe	Severe	Severe	Red maple-----------	65	3	White spruce, northern whitecedar.

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad: Alden	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus, erodes easily.	Severe: ponding.
AlA: Allard	Slight	Slight	Slight	Slight	Slight.
AlB: Allard	Slight	Slight	Moderate: slope.	Slight	Slight.
As: Ashville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BrA, BrB: Barcelona	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BsA, BsB: Busti	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BsC: Busti	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
Ca: Canadice	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Cb: Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cc: Canandaigua	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: wetness.
CdB: Canaseraga	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Moderate: wetness.
CdC: Canaseraga	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Moderate: wetness, slope.
Ce: Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
CfC: Carrollton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, slope, depth to rock.
CfD: Carrollton	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: erodes easily.	Severe: slope.
ChB: Chadakoin	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Moderate: droughty.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ChC-------------------- Chadakoin	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: droughty, slope.
ChD-------------------- Chadakoin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
ChE, ChF-------------- Chadakoin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CkB-------------------- Chautauqua	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: small stones.
CkC-------------------- Chautauqua	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: small stones, slope.
CkD-------------------- Chautauqua	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope.	Severe: slope.
ClA-------------------- Chenango	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Moderate: droughty.
ClB-------------------- Chenango	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: droughty.
CnA, CnB-------------- Chenango	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
CnC-------------------- Chenango	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope, droughty.
CnD, CnE-------------- Chenango	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CoA, CoB-------------- Chenango	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, large stones, droughty.
CpA, CpB-------------- Churchville	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
CpC-------------------- Churchville	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
CsB-------------------- Collamer	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, percs slowly.	Slight----------	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CsC: Collamer	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CvB: Colonie	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
CvC: Colonie	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
DaA, DaB: Dalton	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
DeA, DeB: Darien	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
DeC: Darien	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness.
DkD: Dunkirk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
DkE: Dunkirk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
ElA: Elnora	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
ElB: Elnora	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness, droughty.
ErA, ErB: Erie	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
ErC: Erie	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness, droughty.
Fe*:					
Fluvaquents.					
Udifluvents.					
FmA, FmB: Fremont	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
FmC: Fremont	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FmD------------------ Fremont	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness, slope.
FrB------------------ Frewsburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
FrC------------------ Frewsburg	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Ge------------------- Getzville	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ha------------------- Halsey	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
He------------------- Hamlin	Severe: flooding.	Slight----------	Moderate: flooding.	Slight----------	Moderate: flooding.
Hm------------------- Henrietta	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
HnA------------------ Hinesburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
HnB------------------ Hinesburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
HnC------------------ Hinesburg	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
Ho------------------- Holderton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
HrA, HrB------------- Hornell	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
HrC------------------ Hornell	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness.
HrD------------------ Hornell	Severe: slope, wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
IvB------------------- Ivory	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
KnE------------------- Kinzua	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
La-------------------- Lamson	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
LnB------------------- Langford	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Slight----------	Slight.
LnC------------------- Langford	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Slight----------	Moderate: slope.
MdB------------------- Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: small stones, percs slowly.	Slight----------	Moderate: small stones.
MdC------------------- Mardin	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, small stones, percs slowly.	Slight----------	Moderate: small stones, slope.
MdD------------------- Mardin	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, small stones, percs slowly.	Moderate: slope.	Severe: slope.
Me-------------------- Middlebury	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mn-------------------- Minoa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
NgA, NgB-------------- Niagara	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
OnD------------------- Onoville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
OrA, OrB-------------- Orpark	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
OrC------------------- Orpark	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness.
OrD------------------- Orpark	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: wetness, erodes easily.	Severe: wetness, slope.
Pa-------------------- Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pg*: Pits	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	---
Po: Pompton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
RaA, RaB: Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Rf: Raynham	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
Rh: Red Hook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RnA: Rhinebeck	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RoF*:					
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: depth to rock.
Manlius	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Sa*:					
Saprists.					
Aquents.					
ShB: Schuyler	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: wetness.
ShC: Schuyler	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: slope, wetness.
ShD: Schuyler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
ShE, ShF: Schuyler	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
SoA: Scio	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
SoB: Scio	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: erodes easily, wetness.	Moderate: wetness.
Sw: Swormville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Te: Teel	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Tg: Tioga	Severe: flooding.	Slight	Slight	Severe: erodes easily.	Moderate: droughty.
ToB: Towerville	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones.	Severe: erodes easily.	Moderate: wetness.
ToC: Towerville	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
ToD: Towerville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
ToE, ToF: Towerville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Ud, Ue. Udorthents					
UnA: Unadilla	Slight	Slight	Slight	Slight	Slight.
UnB: Unadilla	Slight	Slight	Moderate: slope.	Moderate: erodes easily.	Slight.
UnC: Unadilla	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Ur*: Urban land	Variable	Variable	Variable	Variable	Variable.
VaB: Valois	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
VaC: Valois	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
VaD: Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
VaE, VaF: Valois	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
VcC: Valois	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
VoA, VoB: Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
VoC-------------------- Volusia	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, small stones, wetness.	Severe: wetness.	Severe: wetness, droughty.
Wa-------------------- Wakeville	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wy-------------------- Wayland	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ad: Alden	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
AlA: Allard	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AlB: Allard	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
As: Ashville	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
BrA: Barcelona	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
BrB: Barcelona	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
BsA: Busti	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Fair	Fair.
BsB: Busti	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Fair	Poor.
BsC: Busti	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
Ca: Canadice	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Cb, Cc: Canandaigua	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Very poor.	Poor	Good.
CdB: Canaseraga	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CdC: Canaseraga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ce: Carlisle	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
CfC: Carrollton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CfD: Carrollton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
ChB: Chadakoin	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChC: Chadakoin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ChD: Chadakoin	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
ChE----------------- Chadakoin	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ChF----------------- Chadakoin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CkB----------------- Chautauqua	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
CkC----------------- Chautauqua	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CkD----------------- Chautauqua	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ClA, ClB, CnA, CnB, CnC----------------- Chenango	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CnD, CnE----------- Chenango	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
CoA, CoB----------- Chenango	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
CpA----------------- Churchville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CpB----------------- Churchville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CpC----------------- Churchville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CsB----------------- Collamer	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CsC----------------- Collamer	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CvB, CvC----------- Colonie	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
DaA, DaB----------- Dalton	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
DeA----------------- Darien	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
DeB----------------- Darien	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DeC----------------- Darien	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DkD----------------- Dunkirk	Poor	Fair	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
DkE----------------- Dunkirk	Very poor.	Poor	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
ElA----------------- Elnora	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
ElB----------------- Elnora	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
ErA----------------- Erie	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
ErB----------------- Erie	Fair	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
ErC----------------- Erie	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Fe*:										
Fluvaquents.										
Udifluvents.										
FmA----------------- Fremont	Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
FmB----------------- Fremont	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
FmC----------------- Fremont	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FmD----------------- Fremont	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FrB----------------- Frewsburg	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Poor.
FrC----------------- Frewsburg	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ge------------------ Getzville	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ha------------------ Halsey	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
He------------------ Hamlin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hm------------------ Henrietta	Poor	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
HnA, HnB------------ Hinesburg	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
HnC----------------- Hinesburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ho------------------ Holderton	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
HrA---------------- Hornell	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
HrB---------------- Hornell	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HrC---------------- Hornell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HrD---------------- Hornell	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
IvB---------------- Ivory	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KnE---------------- Kinzua	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
La----------------- Lamson	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
LnB---------------- Langford	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
LnC---------------- Langford	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
MdB---------------- Mardin	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
MdC---------------- Mardin	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
MdD---------------- Mardin	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Me----------------- Middlebury	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Mn----------------- Minoa	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NgA---------------- Niagara	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NgB---------------- Niagara	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
OnD---------------- Onoville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	---
OrA---------------- Orpark	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
OrB---------------- Orpark	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OrC---------------- Orpark	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
OrD----------------- Orpark	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Pa------------------ Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pg*----------------- Pits	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Po------------------ Pompton	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
RaA----------------- Raynham	Poor	Poor	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
RaB----------------- Raynham	Poor	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Rf------------------ Raynham	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Rh------------------ Red Hook	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RnA----------------- Rhinebeck	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RoF*:										
Rock outcrop------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Manlius-----------	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Sa*:										
Saprists.										
Aquents.										
ShB----------------- Schuyler	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ShC----------------- Schuyler	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShD----------------- Schuyler	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShE----------------- Schuyler	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ShF----------------- Schuyler	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SoA----------------- Scio	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SoB----------------- Scio	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Sw: Swormville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Te: Teel	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Tg: Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ToB: Towerville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ToC: Towerville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ToD: Towerville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ToE, ToF: Towerville	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ud, Ue. Udorthents										
UnA, UnB: Unadilla	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UnC: Unadilla	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ur*. Urban land										
VaB: Valois	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaC: Valois	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
VaD: Valois	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
VaE: Valois	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
VaF: Valois	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
VcC: Valois	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
VoA: Volusia	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
VoB: Volusia	Fair	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
VoC: Volusia	Fair	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Wa-----------------Wakeville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Wy-----------------Wayland	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad--- Alden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
AlA--- Allard	Severe: cutbanks cave.	Slight---	Slight---	Slight---	Severe: frost action.	Slight.
AlB--- Allard	Severe: cutbanks cave.	Slight---	Slight---	Moderate: slope.	Severe: frost action.	Slight.
As--- Ashville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BrA, BrB--- Barcelona	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BsA, BsB--- Busti	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
BsC--- Busti	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
Ca--- Canadice	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Cb--- Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Cc--- Canandaigua	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: wetness.
CdB--- Canaseraga	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
CdC--- Canaseraga	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
Ce--- Carlisle	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
CfC--- Carrollton	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope, depth to rock.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CfD--------------- Carrollton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ChB--------------- Chadakoin	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
ChC--------------- Chadakoin	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
ChD, ChE, ChF----- Chadakoin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CkB--------------- Chautauqua	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones.
CkC--------------- Chautauqua	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: frost action, wetness, slope.	Moderate: small stones, slope.
CkD--------------- Chautauqua	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
ClA--------------- Chenango	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: droughty.
ClB--------------- Chenango	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
CnA--------------- Chenango	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: small stones, droughty.
CnB--------------- Chenango	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
CnC--------------- Chenango	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, slope, droughty.
CnD, CnE---------- Chenango	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CoA, CoB---------- Chenango	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Moderate: small stones, large stones, droughty.
CpA, CpB---------- Churchville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
CpC--------------- Churchville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: low strength, wetness, frost action.	Severe: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CsB--------------- Collamer	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
CsC--------------- Collamer	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
CvB--------------- Colonie	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
CvC--------------- Colonie	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
DaA, DaB---------- Dalton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
DeA, DeB---------- Darien	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
DeC--------------- Darien	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
DkD, DkE---------- Dunkirk	Severe: cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
ElA--------------- Elnora	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
ElB--------------- Elnora	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
ErA, ErB---------- Erie	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
ErC--------------- Erie	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness, droughty.
Fe*: Fluvaquents.						
Udifluvents.						
FmA, FmB---------- Fremont	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
FmC--------------- Fremont	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FmD---------------- Fremont	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope, frost action.	Severe: wetness, slope.
FrB---------------- Frewsburg	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
FrC---------------- Frewsburg	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
Ge----------------- Getzville	Severe: wetness, cutbanks cave.	Severe: wetness, frost action, flooding.	Severe: wetness, flooding.	Severe: wetness, frost action, flooding.	Severe: frost action, wetness.	Severe: wetness.
Ha----------------- Halsey	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, frost action.	Severe: ponding.
He----------------- Hamlin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
Hm----------------- Henrietta	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
HnA---------------- Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Moderate: wetness.
HnB---------------- Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: wetness.
HnC---------------- Hinesburg	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, slope.
Ho----------------- Holderton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
HrA, HrB----------- Hornell	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
HrC---------------- Hornell	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness, slope.	Severe: low strength, wetness.	Severe: wetness.
HrD---------------- Hornell	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope, depth to rock.	Severe: wetness, slope.	Severe: low strength, wetness, slope.	Severe: wetness, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
IvB--------------- Ivory	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
KnE--------------- Kinzua	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
La---------------- Lamson	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
LnB--------------- Langford	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Slight.
LnC--------------- Langford	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope.
MdB--------------- Mardin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, wetness.	Moderate: small stones.
MdC--------------- Mardin	Severe: wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, wetness.	Moderate: small stones, slope.
MdD--------------- Mardin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope.
Me---------------- Middlebury	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
Mn---------------- Minoa	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
NgA, NgB---------- Niagara	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
OnD--------------- Onoville	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
OrA, OrB---------- Orpark	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
OrC--------------- Orpark	Severe: wetness.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness.
OrD--------------- Orpark	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope, depth to rock.	Severe: wetness, slope.	Severe: wetness, slope, frost action.	Severe: wetness, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Pa----------------- Palms	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: ponding, frost action, subsides.	Severe: ponding, excess humus.
Pg*---------------- Pits	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	
Po----------------- Pompton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
RaA, RaB---------- Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
Rf----------------- Raynham	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
Rh----------------- Red Hook	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
RnA---------------- Rhinebeck	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
RoF*:						
Rock outcrop-----	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
Manlius----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sa*:						
Saprists.						
Aquents.						
ShB---------------- Schuyler	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
ShC---------------- Schuyler	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: slope, wetness.
ShD, ShE, ShF----- Schuyler	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
SoA---------------- Scio	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SoB----------------- Scio	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
Sw------------------ Swormville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Te------------------ Teel	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Tg------------------ Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Moderate: droughty.
ToB----------------- Towerville	Severe: depth to rock, wetness.	Moderate: wetness, depth to rock.	Severe: wetness, depth to rock.	Moderate: wetness, slope, depth to rock.	Severe: frost action.	Moderate: wetness.
ToC----------------- Towerville	Severe: depth to rock, wetness.	Moderate: wetness, slope, depth to rock.	Severe: wetness, depth to rock.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
ToD, ToE, ToF------ Towerville	Severe: depth to rock, wetness, slope.	Severe: slope.	Severe: wetness, depth to rock, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Ud, Ue. Udorthents						
UnA----------------- Unadilla	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
UnB----------------- Unadilla	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
UnC----------------- Unadilla	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
Ur*----------------- Urban land	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
VaB----------------- Valois	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
VaC----------------- Valois	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty.
VaD, VaE, VaF------ Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
VcC----------------- Valois	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
VoA, VoB---------- Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, droughty.
VoC--------------- Volusia	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: wetness, frost action.	Severe: wetness, droughty.
Wa---------------- Wakeville	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
Wy---------------- Wayland	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad: Alden	Severe: ponding, percs slowly.	Slight	Severe: ponding.	Severe: ponding.	Poor: ponding.
AlA, AlB: Allard	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
As: Ashville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BrA, BrB: Barcelona	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: small stones, wetness.
BsA, BsB: Busti	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, small stones.
BsC: Busti	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, small stones.
Ca: Canadice	Severe: wetness, percs slowly.	Moderate: excess humus.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Cb: Canandaigua	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cc: Canandaigua	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
CdB: Canaseraga	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
CdC: Canaseraga	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
Ce: Carlisle	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
CfC: Carrollton	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CfD------------------ Carrollton	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
ChB------------------ Chadakoin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones.
ChC------------------ Chadakoin	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones.
ChD, ChE, ChF-------- Chadakoin	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: wetness, slope.	Poor: small stones, slope.
CkB------------------ Chautauqua	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: small stones.
CkC------------------ Chautauqua	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: small stones.
CkD------------------ Chautauqua	Severe: wetness, slope, percs slowly.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Severe: small stones, slope.
ClA, ClB, CnA, CnB-- Chenango	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
CnC------------------ Chenango	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
CnD, CnE------------ Chenango	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: seepage, too sandy, small stones.
CoA, CoB------------ Chenango	Severe: wetness, poor filter.	Severe: flooding, seepage.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: small stones, seepage.
CpA------------------ Churchville	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
CpB------------------ Churchville	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CpC------------------ Churchville	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CsB----------------- Collamer	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
CsC----------------- Collamer	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, slope, wetness.
CvB----------------- Colonie	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
CvC----------------- Colonie	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
DaA, DaB------------ Dalton	Severe: wetness, percs slowly.	Severe: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
DeA----------------- Darien	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
DeB----------------- Darien	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
DeC----------------- Darien	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
DkD, DkE------------ Dunkirk	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
ElA, ElB------------ Elnora	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.
ErA----------------- Erie	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
ErB----------------- Erie	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
ErC----------------- Erie	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Fe*:					
Fluvaquents.					
Udifluvents.					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
FmA----------------- Fremont	Severe: wetness, percs slowly.	Moderate: seepage, excess humus.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
FmB----------------- Fremont	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
FmC----------------- Fremont	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
FmD----------------- Fremont	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness, slope.	Severe: wetness, slope.	Poor: small stones, slope, wetness.
FrB----------------- Frewsburg	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, small stones.
FrC----------------- Frewsburg	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, small stones.
Ge------------------ Getzville	Severe: wetness.	Severe: wetness, seepage, flooding.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
Ha------------------ Halsey	Severe: ponding, poor filter.	Severe: seepage.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, too sandy, small stones.
He------------------ Hamlin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Hm------------------ Henrietta	Severe: ponding.	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
HnA, HnB------------ Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, wetness.
HnC----------------- Hinesburg	Severe: wetness, percs slowly, poor filter.	Severe: seepage, slope, wetness.	Severe: wetness.	Severe: seepage.	Fair: too clayey, slope, wetness.
Ho------------------ Holderton	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HrA, HrB-------------- Hornell	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
HrC------------------ Hornell	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, too clayey, hard to pack.
HrD------------------ Hornell	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, wetness, slope.	Poor: depth to rock, too clayey, hard to pack.
IvB------------------ Ivory	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, small stones.
KnE------------------ Kinzua	Severe: percs slowly, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
La------------------- Lamson	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
LnB------------------ Langford	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
LnC------------------ Langford	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Poor: small stones.
MdB------------------ Mardin	Severe: percs slowly, wetness.	Moderate: slope, seepage.	Severe: wetness.	Moderate: wetness.	Poor: small stones.
MdC------------------ Mardin	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Poor: small stones.
MdD------------------ Mardin	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Poor: slope, small stones.
Me------------------- Middlebury	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness.
Mn------------------- Minoa	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
NgA, NgB-------------- Niagara	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
OnD: Onoville	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: small stones, slope.
OrA, OrB: Orpark	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
OrC: Orpark	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock, wetness.
OrD: Orpark	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, wetness, slope.	Poor: depth to rock, slope, wetness.
Pa: Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: ponding, seepage.	Poor: ponding.
Pg*: Pits	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Slight	Poor: seepage, too sandy, small stones.
Po: Pompton	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, small stones, wetness.
RaA, RaB: Raynham	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rf: Raynham	Severe: flooding, percs slowly, wetness.	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Rh: Red Hook	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
RnA: Rhinebeck	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
RoF*:					
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
RoF*:					
Manlius	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, seepage, small stones.
Sa*:					
Saprists.					
Aquents.					
ShB Schuyler	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: small stones, too clayey.
ShC Schuyler	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope, small stones, too clayey.
ShD, ShE, ShF Schuyler	Severe: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: slope, wetness.	Severe: slope.	Poor: slope.
SoA, SoB Scio	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness, thin layer.
Sw Swormville	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Te Teel	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Tg Tioga	Severe: poor filter, wetness.	Severe: flooding, seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
ToB Towerville	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
ToC Towerville	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
ToD, ToE, ToF Towerville	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Ud, Ue. Udorthents					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
UnA, UnB------------ Unadilla	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-----------	Fair: thin layer.
UnC----------------- Unadilla	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Moderate: slope.	Fair: slope, thin layer.
Ur*----------------- Urban land	Variable---------	Variable---------	Variable---------	Variable---------	Variable.
VaB----------------- Valois	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
VaC----------------- Valois	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
VaD, VaE, VaF------- Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
VcC----------------- Valois	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
VoA, VoB------------ Volusia	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
VoC----------------- Volusia	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Severe: wetness.	Poor: small stones, wetness.
Wa------------------ Wakeville	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Wy------------------ Wayland	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ad: Alden	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
AlA, AlB: Allard	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
As: Ashville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
BrA, BrB: Barcelona	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, wetness.
BsA, BsB, BsC: Busti	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, area reclaim.
Ca: Canadice	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Cb, Cc: Canandaigua	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CdB, CdC: Canaseraga	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Ce: Carlisle	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
CfC: Carrollton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CfD: Carrollton	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
ChB, ChC: Chadakoin	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
ChD: Chadakoin	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
ChE, ChF: Chadakoin	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CkB: Chautauqua	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
CkC: Chautauqua	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
CkD: Chautauqua	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ClA, ClB, CnA, CnB, CnC: Chenango	Good	Probable	Probable	Poor: small stones, area reclaim.
CnD, CnE: Chenango	Poor: slope.	Probable	Probable	Poor: slope, small stones, area reclaim.
CoA, CoB: Chenango	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
CpA, CpB, CpC: Churchville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
CsB: Collamer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CsC: Collamer	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
CvB, CvC: Colonie	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
DaA, DaB: Dalton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, area reclaim, small stones.
DeA, DeB, DeC: Darien	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
DkD: Dunkirk	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
DkE: Dunkirk	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ElA, ElB: Elnora	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
ErA, ErB, ErC: Erie	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Fe*:				
Fluvaquents.				
Udifluvents.				
FmA, FmB, FmC, FmD---- Fremont	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
FrB, FrC---------- Frewsburg	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
Ge---------- Getzville	Poor: wetness, frost action.	Probable----------	Probable----------	Poor: wetness.
Ha---------- Halsey	Poor: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim, wetness.
He---------- Hamlin	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Hm---------- Henrietta	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HnA, HnB, HnC---------- Hinesburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Ho---------- Holderton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
HrA, HrB, HrC, HrD---- Hornell	Poor: depth to rock, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, wetness.
IvB---------- Ivory	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
KnE---------- Kinzua	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
La---------- Lamson	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
LnB, LnC---------- Langford	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
MdB, MdC---------- Mardin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MdD: Mardin	Fair: slope, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Me: Middlebury	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
Mn: Minoa	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
NgA, NgB: Niagara	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
OnD: Onoville	Fair: shrink-swell, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
OrA, OrB, OrC: Orpark	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
OrD: Orpark	Poor: depth to rock, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness, slope.
Pa: Palms	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess humus.
Pg*: Pits	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Po: Pompton	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
RaA, RaB, Rf: Raynham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Rh: Red Hook	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
RnA: Rhinebeck	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
RoF*: Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
RoF*:				
Manlius	Poor: depth to rock, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Sa*:				
Saprists.				
Aquents.				
ShB Schuyler	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
ShC Schuyler	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, small stones.
ShD Schuyler	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ShE, ShF Schuyler	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
SoA, SoB Scio	Fair: wetness.	Probable	Probable	Fair: area reclaim.
Sw Swormville	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Te Teel	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
Tg Tioga	Good	Probable	Probable	Poor: small stones, area reclaim.
ToB, ToC Towerville	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ToD Towerville	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
ToE, ToF Towerville	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Ud, Ue. Udorthents				
UnA, UnB, UnC Unadilla	Good	Probable	Probable	Moderate: area reclaim.
Ur* Urban land	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
VaB, VaC: Valois	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
VaD: Valois	Fair: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
VaE, VaF: Valois	Poor: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
VcC: Valois	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
VoA, VoB, VoC: Volusia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, wetness.
Wa: Wakeville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Wy: Wayland	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ad: Alden	Slight	Severe: piping, wetness.	Slight	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily rooting deptł
AlA, AlB: Allard	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Erodes easily, too sandy.	Erodes easily.
As: Ashville	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily rooting depth
BrA: Barcelona	Moderate: seepage, depth to rock.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Erodes easily, wetness.	Wetness, erodes easily
BrB: Barcelona	Moderate: seepage, depth to rock, slope.	Severe: piping, wetness.	Severe: slow refill.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily
BsA: Busti	Moderate: seepage.	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness.
BsB: Busti	Moderate: slope,	Severe: wetness.	Severe: no water.	Percs slowly, frost action,	Wetness, percs slowly.	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
CfC, CfD---------- Carrollton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
ChB--------------- Chadakoin	Moderate: seepage, slope.	Severe: piping.	Severe: slow refill.	Deep to water	Favorable------	Droughty.
ChC, ChD, ChE, ChF-------------- Chadakoin	Severe: slope.	Severe: piping.	Severe: slow refill.	Deep to water	Slope----------	Slope, droughty.
CkB--------------- Chautauqua	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Slope----------	Wetness--------	Droughty.
CkC, CkD---------- Chautauqua	Severe: slope.	Moderate: piping.	Severe: no water.	Slope----------	Wetness, slope.	Slope, droughty.
ClA, ClB, CnA, CnB-------------- Chenango	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy------	Droughty.
CnC, CnD, CnE----- Chenango	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
CoA, CoB---------- Chenango	Severe: seepage.	Severe: seepage.	Moderate: deep to water, slow refill.	Deep to water	Large stones---	Droughty, large stones.
CpA--------------- Churchville	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
CpB--------------- Churchville	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
CpC--------------- Churchville	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
CsB--------------- Collamer	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
CsC--------------- Collamer	Severe: slope.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
CvB--------------- Colonie	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
CvC--------------- Colonie	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
DaA, DaB---------- Dalton	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Erodes easily, wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
DeA: Darien	Slight	Severe: piping, wetness.	Severe: no water.	Frost action	Erodes easily, wetness.	Wetness, erodes easily.
DeB: Darien	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
DeC: Darien	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
DkD, DkE: Dunkirk	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
ElA: Elnora	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, too sandy.	Droughty.
ElB: Elnora	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, too sandy.	Droughty.
ErA: Erie	Slight	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Large stones, wetness.	Large stones, wetness.
ErB: Erie	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones, wetness.	Large stones, wetness.
ErC: Erie	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones, wetness.	Large stones, wetness, slope.
Fe*: Fluvaquents.						
Udifluvents.						
FmA: Fremont	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
FmB: Fremont	Moderate: seepage, slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
FmC, FmD: Fremont	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
FrB: Frewsburg	Moderate: depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Depth to rock, frost action, slope.	Depth to rock, erodes easily.	Wetness, erodes easily.
FrC: Frewsburg	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Depth to rock, frost action, slope.	Slope, depth to rock, erodes easily.	Wetness, slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ge----------------- Getzville	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave, poor outlets, wetness.	Not needed-----	Erodes easily, wetness.
Ha----------------- Halsey	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Ponding, frost action.	Ponding, too sandy.	Wetness.
He----------------- Hamlin	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
Hm----------------- Henrietta	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Wetness, rooting depth.
HnA---------------- Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Favorable------	Erodes easily, wetness.	Erodes easily.
HnB---------------- Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Slope----------	Erodes easily, wetness.	Erodes easily.
HnC---------------- Hinesburg	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Slope----------	Slope, erodes easily, wetness.	Slope, erodes easily.
Ho----------------- Holderton	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Wetness---------	Wetness.
HrA---------------- Hornell	Moderate: depth to rock.	Severe: wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, erodes easily.	Wetness, erodes easily.
HrB---------------- Hornell	Moderate: depth to rock, slope.	Severe: wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, erodes easily.	Wetness, erodes easily.
HrC, HrD----------- Hornell	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Slope, depth to rock, erodes easily.	Wetness, slope, erodes easily.
IvB---------------- Ivory	Moderate: slope.	Severe: wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
KnE---------------- Kinzua	Severe: slope.	Severe: piping.	Severe: slow refill.	Deep to water	Slope----------	Slope.
La----------------- Lamson	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, frost action.	Ponding, soil blowing.	Wetness.
LnB---------------- Langford	Moderate: slope.	Moderate: piping, large stones, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, rooting depth.	Large stones, rooting depth.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
LnC-- Langford	Severe: slope.	Moderate: piping, large stones, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, wetness, rooting depth.	Large stones, slope, rooting depth.
MdB-- Mardin	Moderate: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Wetness, rooting depth, percs slowly.	Wetness, rooting depth, percs slowly.
MdC, MdD-- Mardin	Severe: slope.	Moderate: piping.	Severe: no water.	Slope, percs slowly.	Slope, wetness, rooting depth.	Slope, wetness, rooting depth.
Me-- Middlebury	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness--	Wetness.
Mn-- Minoa	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness--	Wetness.
NgA-- Niagara	Slight--	Severe: piping, wetness.	Severe: slow refill.	Frost action--	Erodes easily, wetness.	Wetness, erodes easily.
NgB-- Niagara	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
OnD-- Onoville	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
OrA-- Orpark	Moderate: depth to rock.	Severe: piping, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, erodes easily.	Wetness, erodes easily.
OrB-- Orpark	Moderate: depth to rock, slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, erodes easily.	Wetness, erodes easily.
OrC, OrD-- Orpark	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, depth to rock, frost action.	Slope, depth to rock, erodes easily.	Wetness, slope, erodes easily.
Pa-- Palms	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness, rooting depth.
Pg*-- Pits	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, too sandy.	Large stones, droughty.
Po-- Pompton	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, too sandy.	Wetness.
RaA-- Raynham	Slight--	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
RaB----------------- Raynham	Moderate: slope.	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Rf------------------ Raynham	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, flooding, frost action.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Rh------------------ Red Hook	Moderate: seepage.	Severe: wetness, seepage, piping.	Severe: slow refill.	Frost action---	Wetness---------	Wetness.
RnA----------------- Rhinebeck	Slight---------	Severe: wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, erodes easily.	Wetness, erodes easily.
RoF*:						
Rock outcrop-----	Severe: depth to rock, slope.	---	Severe: depth to rock.	Depth to rock	Slope, depth to rock.	Slope, depth to rock.
Manlius----------	Severe: slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Sa*:						
Saprists.						
Aquents.						
ShB-----------------	Moderate:	Severe:	Severe:	Percs slowly,	Erodes easily,	Erodes easily,
Tg------------------ Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, droughty.
ToB----------------- Towerville	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Percs slowly, depth to rock, frost action.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
ToC, ToD, ToE, ToF--------------- Towerville	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, depth to rock, frost action.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Ud, Ue. Udorthents						
UnA----------------- Unadilla	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
UnB----------------- Unadilla	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
UnC----------------- Unadilla	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Ur*----------------- Urban land	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
VaB--------------- Valois	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Droughty.
VaC, VaD, VaE, VaF, VcC--------- Valois	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, droughty.
VoA--------------- Volusia	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Large stones---	Large stones, wetness.
VoB--------------- Volusia	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Large stones---	Large stones, wetness.
VoC--------------- Volusia	Severe: slope.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, large stones.	Large stones, wetness, slope.
Wa---------------- Wakeville	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Wy---------------- Wayland	Slight---------	Severe: piping, ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Ad----------------- Alden	0-9	Mucky silt loam	ML, OL	A-7, A-5	0	80-100	75-100	65-95	55-85	40-50	5-15
	9-35	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-85	20-35	5-15
	35-72	Gravelly loam, fine sandy loam, silty clay loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	60-95	50-90	45-90	30-85	20-35	5-15
AlA, AlB---------- Allard	0-8	Silt loam--------	ML	A-4	0	100	95-100	90-100	70-90	<35	NP-10
	8-30	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	70-90	<35	NP-10
	30-72	Stratified sand to very gravelly loamy sand.	GM, GW, SW, SM	A-1, A-2, A-3	0	25-100	20-100	10-75	0-30	---	NP
As----------------- Ashville	0-9	Silt loam--------	ML, OL	A-6, A-7	0	80-100	75-100	65-95	55-85	40-50	5-15
	9-36	Silt loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	80-100	75-100	65-95	55-85	20-35	5-15
	36-72	Very gravelly silt loam, gravelly loam, fine sandy loam.	CL, GC, SC, CL-ML	A-2, A-4, A-6	0-5	45-95	40-90	30-90	25-85	20-35	5-15
BrA, BrB---------- Barcelona	0-9	Silt loam--------	ML, CL	A-4, A-5, A-6, A-7	0	95-100	95-100	70-100	55-90	30-45	5-15
	9-29	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-100	25-35	3-13
	29-51	Very channery silt loam, very channery silty clay loam, very gravelly loam.	GM, GC, ML, CL	A-4, A-6	10-15	45-80	40-75	35-75	25-70	25-35	3-13
	51	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BsA, BsB, BsC----- Busti	0-8	Silt loam--------	ML, SM, SM-SC	A-4, A-6	0-5	80-95	75-90	65-85	45-75	20-40	1-12
	8-12	Silt loam, loam	ML, SM, CL-ML	A-4, A-6	0-5	80-95	75-90	65-85	45-75	20-40	1-12
	12-27	Silt loam, loam, gravelly silt loam.	ML, GM, SM	A-4	0-5	55-95	50-90	45-85	35-75	15-25	NP-5
	27-72	Gravelly silt loam, gravelly loam.	ML, GM, SM	A-4	0-5	55-80	50-70	40-70	35-65	15-25	NP-5
Ca----------------- Canadice	0-9	Silty clay loam	ML, MH, OL, OH	A-7	0	100	95-100	85-100	65-95	40-65	10-25
	9-40	Silty clay, clay, silty clay loam.	CL, CH, MH, ML	A-7	0	100	95-100	85-100	70-95	45-65	20-30
	40-72	Silty clay, clay, silty clay loam.	CL, CH, MH, ML	A-7	0	100	95-100	85-100	70-95	45-65	20-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Cb-------------- Canandaigua	0-10	Silt loam--------	ML, MH	A-4, A-5, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	10-45	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, CL	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	45-72	Gravelly loam, gravelly silt loam.	SC, CL, CL-ML, GC	A-4	0-5	65-80	60-75	50-75	35-70	20-30	5-10
Cc-------------- Canandaigua	0-10	Mucky silt loam	ML, OL, MH, OH	A-4, A-5, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	10-45	Silt loam, very fine sandy loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	45-72	Silt loam, very fine sandy loam.	ML, CL, CL-ML	A-4	0	95-100	95-100	90-100	70-95	20-30	3-10
CdB, CdC--------- Canaseraga	0-2	Silt loam--------	ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-4
	2-23	Silt loam, very fine sandy loam.	CL-ML, ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-6
	23-55	Channery silt loam, channery loam, loam.	ML, CL, GC, GM	A-4, A-2	5-10	65-85	60-80	50-75	30-75	20-25	3-8
	55-72	Channery silt loam, channery loam, loam.	ML, CL, GC, GM	A-4, A-2	5-10	65-85	60-80	50-75	30-75	20-25	3-8
Ce-------------- Carlisle	0-90	Sapric material	PT	A-8	0-30	---	---	---	---	---	---
CfC, CfD--------- Carrollton	0-4	Channery silt loam.	CL, CL-ML, GC, SM-SC	A-4, A-6	0-5	55-85	50-80	45-70	35-65	20-40	4-15
	4-27	Channery silt loam, channery silty clay loam, flaggy silt loam.	CL, CL-ML, GC, SM-SC	A-4, A-6	0-20	50-85	45-80	40-70	35-70	20-40	4-15
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ChB, ChC, ChD, ChE, ChF-------- Chadakoin	0-4	Silt loam--------	ML, SM, CL-ML	A-4, A-6	0-5	80-95	75-90	50-90	40-75	20-40	1-12
	4-24	Silt loam, gravelly loam, gravelly fine sandy loam.	GM, ML, SM, GM-GC	A-4, A-2	0-5	60-95	55-90	45-90	30-70	15-25	NP-5
	24-43	Channery silt loam, gravelly loam, gravelly sandy loam.	GM, SM, ML, GM-GC	A-4, A-2	0-10	55-80	50-70	30-70	25-65	15-25	NP-5
	43-72	Channery silt loam, gravelly loam, sandy loam.	GM, SM, GM-GC	A-4, A-2	0-15	50-75	45-70	30-65	26-60	15-25	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CkB, CkC, CkD----- Chautauqua	0-7	Silt loam--------	ML, SM, CL-ML, SM-SC	A-4, A-6	0-5	80-95	75-90	65-85	45-75	20-40	1-12
	7-34	Channery silt loam, gravelly loam, silt loam.	ML, GM, SM, CL-ML	A-4	0-5	55-95	50-90	45-80	35-70	15-25	NP-5
	34-72	Gravelly silt loam, very gravelly loam.	GM, CL-ML, SM, GM-GC	A-2-4, A-4	0-5	50-75	45-70	40-65	30-60	15-25	NP-5
ClA, ClB--------- Chenango	0-6	Silt loam--------	ML, SM	A-4, A-2	0-5	80-90	75-85	45-85	25-75	<35	NP-10
	6-45	Gravelly silt loam, gravelly fine sandy loam, very gravelly silt loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<40	NP-10
	45-72	Very gravelly loamy coarse sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, GP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
CnA, CnB, CnC, CnD, CnE-------- Chenango	0-6	Gravelly loam----	ML, SM, GM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	6-45	Gravelly silt loam, gravelly fine sandy loam, very gravelly fine sandy loam, very gravelly silt loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<40	NP-10
	45-72	Very gravelly loamy coarse sand, very gravelly loamy sand, very gravelly sand, gravelly loamy fine sand.	GW, GM, SM, GP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
CoA, CoB--------- Chenango	0-6	Channery loam----	ML, GM, SM	A-2, A-4, A-1	5-15	55-85	55-80	35-80	15-70	<35	NP-10
	6-45	Channery silt loam, channery loam, very channery fine sandy loam.	ML, GM, SM, GP-GM	A-2, A-4, A-1	5-20	25-75	20-70	15-70	10-65	<40	NP-10
	45-72	Very channery silt loam, very channery loam, very channery sandy loam.	GM, GP-GM	A-1, A-2, A-4, A-3	10-20	15-60	10-55	5-55	5-50	<35	NP-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CpA, CpB, CpC---- Churchville	0-7	Silt loam--------	ML, CL, MH	A-7	0	95-100	90-100	80-100	75-90	40-55	15-25
	7-33	Silty clay loam, silty clay, clay loam.	CL	A-7	0	95-100	95-100	90-100	75-95	40-50	25-35
	33-72	Gravelly loam, gravelly very fine sandy loam, silty clay loam.	ML, GM, CL, GC	A-2, A-4	0-5	60-90	55-85	45-80	30-75	10-20	1-8
CsB, CsC--------- Collamer	0-7	Silt loam--------	ML, SM, CL-ML, SM-SC	A-4	0	95-100	95-100	65-100	40-90	25-35	5-10
	7-21	Silt loam, very fine sandy loam, fine sandy loam.	ML, CL, CL-ML, SM-SC	A-4	0	95-100	95-100	65-100	40-90	20-30	3-10
	21-45	Silt loam, silty clay loam, sandy clay loam.	CL, CL-ML, ML	A-4, A-6	0	95-100	95-100	90-100	75-95	20-35	5-15
	45-72	Silt loam, very fine sand, silty clay loam.	ML, SM, CL-ML, CL	A-4, A-6	0	95-100	95-100	70-100	40-90	20-35	3-15
CvB, CvC--------- Colonie	0-9	Loamy fine sand	SM	A-2, A-4	0	100	95-100	65-95	20-40	---	NP
	9-45	Loamy fine sand, fine sand.	SM	A-2, A-4	0	100	95-100	65-95	20-40	---	NP
	45-72	Fine sand, loamy fine sand.	SM	A-2, A-4	0	100	95-100	65-95	20-40	---	NP
DaA, DaB--------- Dalton	0-9	Silt loam--------	ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-4
	9-23	Silt loam, very fine sandy loam.	CL-ML, ML	A-4	0-2	95-100	95-100	90-95	80-90	<20	NP-6
	23-72	Channery loam, channery silt loam, loam.	ML, GM, SM	A-4, A-2	5-10	65-85	60-80	50-75	30-75	<25	2-6
DeA, DeB, DeC---- Darien	0-9	Silt loam--------	ML, SM	A-4, A-7	0	80-95	75-90	65-90	45-85	35-45	5-15
	9-31	Clay loam, channery silt loam, silty clay loam.	CL, CL-ML, SC, GM-GC	A-4, A-6	0-5	50-95	55-90	50-90	40-85	25-35	5-15
	31-72	Channery clay loam, very channery silt loam, silty clay loam.	CL, CL-ML, SC, GM-GC	A-4, A-2, A-6	5-15	40-95	35-90	30-90	25-85	25-35	5-15
DkD, DkE--------- Dunkirk	0-6	Silt loam--------	CL, CL-ML	A-4	0	95-100	95-100	90-100	70-90	20-30	5-10
	6-12	Silt loam, very fine sandy loam, fine sandy loam.	CL, CL-ML	A-4	0	95-100	95-100	90-100	70-90	20-30	5-10
	12-38	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-30	5-15
	38-72	Silt, very fine sand, silty clay loam.	ML, SM	A-4	0	95-100	95-100	70-100	40-95	<15	NP-4
ElA, ElB--------- Elnora	0-9	Fine sandy loam	SM, ML	A-2, A-4	0	100	100	70-95	25-60	---	NP
	9-30	Loamy fine sand, fine sand.	SM	A-2, A-4	0	100	100	70-95	25-45	---	NP
	30-72	Fine sand, loamy fine sand.	SM	A-2, A-4	0	100	100	60-85	20-45	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ErA, ErB, ErC---- Erie	0-12	Silt loam--------	ML, SM	A-2, A-4	0-5	80-90	75-85	50-85	30-75	30-40	5-10
	12-15	Channery fine sandy loam, channery silt loam, channery loam.	GC, SC, CL, CL-ML	A-2, A-4, A-1	5-10	55-90	50-85	40-70	20-65	15-25	5-10
	15-35	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	55-75	50-70	40-65	30-65	25-35	10-15
	35-72	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	55-75	50-70	40-65	30-65	25-35	10-15
Fe*: Fluvaquents.											
Udifluvents.											
FmA, FmB, FmC, FmD------------- Fremont	0-8	Silt loam--------	ML, CL, OL	A-6, A-7	0-10	80-90	75-85	70-85	55-80	35-45	10-20
	8-35	Silt loam, silty clay loam, channery silty clay loam.	CL, GC, SC	A-6	0-10	55-90	50-85	45-85	35-80	25-40	10-20
	35-72	Silty clay loam, channery silt loam.	CL, GC, CL-ML, SM-SC	A-6, A-4, A-1, A-2	0-10	30-75	25-70	20-70	15-65	25-40	5-15
FrB, FrC--------- Frewsburg	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	80-100	75-90	65-90	50-80	20-40	4-15
	7-17	Channery silt loam, flaggy loam, silt loam.	CL-ML, CL, SM-SC, GC	A-4, A-6	0-5	65-95	55-90	45-75	40-70	20-40	4-20
	17-38	Channery loam, flaggy silty clay loam, clay loam.	CL-ML, CL, SM-SC, GC	A-4, A-6	0-10	65-95	55-90	40-75	35-70	20-40	4-20
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ge--------------- Getzville	0-10	Silt loam--------	ML, CL, OL	A-7, A-6	0	95-100	90-100	80-100	65-95	35-45	10-20
	10-22	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	95-100	90-100	80-100	65-95	20-40	5-20
	22-72	Stratified loamy fine sand to very gravelly sand.	SW, SP, SM, SW-SM	A-1, A-2, A-3	0-5	55-100	50-100	25-80	2-35	---	NP
Ha--------------- Halsey	0-9	Mucky silt loam	ML, CL, CL-ML	A-4	0-2	80-100	75-100	50-90	50-90	20-30	3-10
	9-26	Loam, silt loam, gravelly fine sandy loam.	SM, GC, ML, CL	A-2, A-4	0-2	65-100	50-100	35-90	30-85	20-30	3-10
	26-72	Stratified sandy loam to very gravelly sand.	SP, GP, GM, SM	A-1, A-2, A-3	5-10	30-90	25-85	20-70	0-35	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
He---------------- Hamlin	0-8	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	8-31	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	31-38	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	38-72	Silt loam, very fine sandy loam, fine sandy loam.	ML, SM, CL, SM-SC	A-4	0	95-100	95-100	75-100	45-90	<25	NP-10
Hm---------------- Henrietta	0-12	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	12-35	Stratified loamy fine sand to silt loam.	CL, ML, SM, SC	A-2-4, A-4	0	95-100	85-100	50-100	25-85	<25	2-10
	35-72	Stratified loamy fine sand to silt loam.	CL, ML, SM, SC	A-2-4, A-4	0	95-100	85-100	50-100	25-85	<25	2-10
HnA, HnB, HnC----- Hinesburg	0-9	Fine sandy loam	SM	A-2, A-4	0-5	95-100	85-100	60-85	25-45	---	NP
	9-32	Loamy fine sand, loamy sand, sand.	SP-SM, SM	A-2, A-3	0-5	95-100	85-100	50-80	5-30	---	NP
	32-72	Very fine sandy loam, silt loam, silty clay loam.	ML	A-4	0	95-100	90-100	75-90	55-80	<30	NP-5
Ho---------------- Holderton	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	80-100	75-100	75-100	50-90	25-35	5-10
	10-38	Silt loam, loam, gravelly fine sandy loam.	ML, SM, CL-ML, SM-SC	A-4, A-2	0	75-100	70-100	50-100	30-85	20-25	2-5
	38-72	Silt loam, loam, gravelly sandy loam.	ML, CL-ML, SM, GM-GC	A-2, A-4, A-1	0-5	60-100	55-100	40-100	20-80	10-20	2-5
HrA, HrB, HrC, HrD-------------- Hornell	0-8	Silt loam--------	ML, CL	A-6, A-7	0	95-100	90-100	80-100	65-90	35-49	10-22
	8-36	Silty clay, channery silty clay loam, clay.	ML, CL, CH, GC	A-6, A-7	0-5	60-95	50-90	45-90	35-85	35-55	10-30
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
IvB--------------- Ivory	0-5	Silty clay loam	ML, CL	A-4, A-6, A-7-6	0-5	85-100	80-95	75-95	65-90	35-50	5-20
	5-15	Channery silty clay loam, silty clay, clay.	ML, CL, CH	A-4, A-6, A-7	0-5	65-100	60-95	60-95	60-90	30-55	5-30
	15-35	Channery silty clay loam, silty clay, clay.	ML, CL, CH, SC	A-4, A-6, A-7	0-10	65-100	60-95	55-95	45-90	30-55	5-30
	35-72	Very channery silt loam, channery silty clay loam, channery clay.	ML, CL, CH, GC	A-2, A-4, A-6, A-7	0-20	45-80	40-75	30-75	20-70	30-55	5-30
	72	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
KnE-------------- Kinzua	0-3	Channery silt loam.	CL, CL-ML, GC, SM-SC	A-4, A-6	0-5	60-80	55-75	50-65	35-60	20-40	4-15
	3-42	Channery loam, channery silt loam, silty clay loam.	GC, CL, CL-ML, SM-SC	A-4, A-6	0-10	60-100	55-95	45-85	40-80	20-40	4-15
	42-72	Very channery loam, channery silty clay loam, clay loam.	CL-ML, SM-SC, CL, GC	A-2, A-4, A-6, A-1-b	0-10	40-90	35-85	30-70	20-60	20-40	4-15
La--------------- Lamson	0-8	Silt loam--------	SM, ML	A-4	0	95-100	90-100	70-90	40-85	<20	NP-4
	8-37	Fine sandy loam, very fine sandy loam.	SM, ML	A-4	0	95-100	80-100	55-95	45-65	<20	NP-4
	37-72	Fine sand, very fine sand, silt loam.	SM, ML	A-2, A-4	0	95-100	80-100	60-90	20-90	---	NP
LnB, LnC--------- Langford	0-9	Silt loam--------	ML, CL, SM, SC	A-4, A-2	0-5	80-90	75-85	55-85	30-75	25-35	5-10
	9-21	Channery silt loam, channery loam, fine sandy loam.	CL, GM-GC, SC, CL-ML	A-4, A-2, A-1	5-10	60-75	55-70	40-70	20-65	15-25	5-10
	21-45	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	25-75	20-70	15-70	15-65	25-35	10-15
	45-72	Channery silt loam, channery silty clay loam, very channery loam.	CL, GC, SC	A-2, A-6	10-25	25-75	20-70	15-70	15-65	25-35	10-15
MdB, MdC, MdD---- Mardin	0-14	Channery silt loam.	GM, ML, CL, GC	A-4	5-20	65-75	60-70	50-70	35-60	25-35	5-10
	14-18	Channery silt loam, loam, gravelly loam.	CL, GC, CL-ML, SM-SC	A-4	5-10	60-90	55-90	45-90	35-80	15-25	5-10
	18-45	Channery loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
	45-72	Channery loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4, A-1	10-25	40-80	35-75	30-70	20-65	20-30	5-10
Me--------------- Middlebury	0-6	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4, A-2	0	80-100	75-100	50-100	30-90	25-35	5-10
	6-43	Silt loam, loam, gravelly fine sandy loam.	ML, SM, SM-SC, CL-ML	A-4, A-2	0	75-100	70-100	50-100	30-85	20-25	2-5
	43-72	Stratified gravelly sandy loam to sand.	GW, GM, SW, SM	A-1, A-2, A-3	0-5	40-100	35-100	20-100	0-35	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Mn--------------- Minoa	0-5	Fine sandy loam	ML, SM	A-4	0	95-100	90-100	65-95	35-75	<20	NP-4
	5-35	Loamy very fine sand, silt loam, fine sandy loam.	ML, SM	A-4	0	95-100	90-100	65-95	35-90	<20	NP-4
	35-48	Loamy very fine sand, fine sandy loam, silt loam.	SM, ML	A-4	0	95-100	90-100	65-95	35-90	<20	NP-4
	48-72	Loamy fine sand, fine sandy loam, silt loam.	SM, ML	A-2, A-4	0	95-100	90-100	60-100	20-90	<20	NP-4
NgA, NgB--------- Niagara	0-15	Silt loam--------	ML	A-4, A-7, A-6, A-5	0	95-100	95-100	70-100	55-90	30-45	5-15
	15-26	Silt loam, silty clay loam, very fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-100	25-35	3-13
	26-60	Silt loam, very fine sandy loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-100	25-35	3-13
	60-72	Channery silty clay loam, gravelly loam.	GM, GC, ML, CL	A-4, A-2, A-6	5-10	55-80	50-75	40-75	30-70	25-35	3-13
OnD-------------- Onoville	0-2	Silt loam--------	CL-ML, CL	A-4, A-6	0	80-100	75-95	70-95	60-90	20-40	4-15
	2-17	Silty clay loam, channery silt loam, very flaggy loam.	CL-ML, CL, SM-SC, GC	A-4, A-6, A-7	0-5	60-95	50-90	50-90	40-85	20-45	4-25
	17-38	Silty clay loam, channery silt loam, very flaggy loam.	CL-ML, CL, SM-SC, GC	A-4, A-6, A-7	0-10	60-95	50-90	45-85	40-80	20-45	4-25
	38-72	Channery silty clay loam, very channery silt loam, very flaggy loam.	CL-ML, CL, GM-GC, SC	A-2, A-4, A-6, A-7	5-10	30-85	25-80	25-80	20-75	20-45	4-20
OrA, OrB, OrC, OrD------------- Orpark	0-7	Silt loam--------	ML, OL	A-4, A-5, A-7	0	90-100	85-100	70-100	70-100	35-49	6-15
	7-26	Silt loam, silty clay loam, channery silt loam.	ML, CL	A-4, A-6	0	75-100	70-100	65-100	55-100	30-40	6-15
	26	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pa--------------- Palms	0-36	Sapric material	PT	A-8	0	---	---	---	---	---	---
	36-72	Clay loam, silty clay loam, gravelly sandy loam.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7, A-2	0	85-100	60-100	35-95	15-90	20-45	5-20
Pg*-------------- Pits	0-6	Variable---------	GP, GW	A-1	0-25	10-25	5-25	0-15	0-5	---	NP
	6-60	Extremely gravelly sand, extremely gravelly coarse sand, very gravelly coarse sand.	GP, GW, SP, SW	A-1	0-25	10-55	5-50	0-15	0-5	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Po-------------- Pompton	0-10	Silt loam--------	SM, SC, ML	A-4, A-2	0	85-95	85-95	65-75	35-60	20-30	3-10
	10-34	Fine sandy loam, sandy loam, gravelly sandy loam.	SM, SC, SM-SC	A-2, A-4	0-5	80-100	50-100	45-75	30-50	20-30	3-10
	34-72	Stratified gravelly loamy sand to sand.	SM, GP-GM, GM, SP-SM	A-1	0-10	35-80	20-80	20-40	5-15	>20	NP
RaA, RaB--------- Raynham	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
	7-24	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
	24-72	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	70-95	<25	NP-5
Rf-------------- Raynham	0-7	Silt loam--------	ML	A-4	0	100	95-100	80-100	55-95	<25	NP-10
	7-24	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	80-100	55-95	<25	NP-10
	24-72	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	70-95	<25	NP-10
Rh-------------- Red Hook	0-10	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4, A-2, A-6	0-5	80-100	75-95	45-95	25-80	15-40	1-15
	10-32	Silt loam, loam, very gravelly sandy loam.	ML, SM, GM, SM-SC	A-1, A-2, A-4, A-6	0-5	30-90	25-85	15-80	10-70	15-30	1-15
	32-72	Gravelly loam, gravelly silt loam, very gravelly sandy loam.	GM, SM, SM-SC, ML	A-1, A-2, A-4, A-6	5-10	30-80	25-75	15-75	10-70	15-30	1-15
RnA------------- Rhinebeck	0-15	Silt loam--------	ML, MH, CL, CH	A-6, A-7	0	80-100	75-100	70-100	60-90	30-55	10-25
	15-44	Silty clay loam, silty clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-100	30-55	15-30
	44-72	Stratified silt to very fine sand.	ML, CL, CL-ML	A-4	0	90-100	85-100	65-100	55-95	10-30	NP-10
RoF*:											
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Manlius---------	0-3	Channery silt loam.	ML, GM, SM, CL-ML	A-4, A-2	5-25	55-80	50-75	35-75	25-70	25-35	4-10
	3-21	Very channery silt loam, very channery loam.	GM, GM-GC, GW-GM	A-2, A-4, A-1	10-25	25-60	20-55	15-55	10-50	25-35	4-10
	21-25	Very channery silt loam, very channery loam.	GM, GM-GC, GW-GM	A-1, A-2, A-4	10-25	20-60	15-55	10-55	5-50	25-35	4-10
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Sa*: Saprists.											
Aquents.											
ShB, ShC, ShD, ShE, ShF-------- Schuyler	0-9	Silt loam--------	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	80-95	75-90	55-85	30-80	25-40	5-20
	9-29	Silt loam, very channery loam, channery silty clay loam.	SC, GC, CL, CL-ML	A-4, A-6	5-15	70-95	65-90	55-85	40-80	25-40	5-20
	29-72	Very channery silt loam, loam, channery silty clay loam.	GC, CL, SC, CL-ML	A-4, A-6	5-15	65-95	60-90	50-85	35-80	25-40	5-20
SoA, SoB--------- Scio	0-9	Silt loam--------	ML	A-4	0	100	95-100	90-100	70-90	<20	NP-4
	9-48	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	70-90	<20	NP-4
	48-72	Stratified very gravelly sand to silt loam.	ML, SM, SP, GP-GM	A-4, A-2, A-1, A-3	0	35-95	30-90	15-85	2-80	<10	NP-4
Sw--------------- Swormville	0-10	Silt loam--------	ML, CL, OL	A-6, A-7	0	95-100	90-100	75-100	70-90	35-45	10-20
	10-25	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	75-100	70-95	20-40	5-20
	25-30	Loamy fine sand, loamy very fine sand, very gravelly very fine sandy loam.	SM, ML, GW-GM, SW-SM	A-1, A-2, A-4	0	50-100	45-100	30-95	10-65	---	NP
	30-72	Loamy fine sand, sand, very gravelly sand.	GW, GM, SW, SM	A-1, A-2, A-3	0-5	50-100	45-100	20-80	2-35	---	NP
Te--------------- Teel	0-6	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	70-90	15-35	2-15
	6-28	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	65-90	15-35	2-15
	28-72	Silt loam, fine sandy loam, gravelly very fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6, A-2	0-5	75-100	70-100	50-100	30-90	<35	NP-15
Tg--------------- Tioga	0-11	Silt loam--------	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
	11-38	Silt loam, loam, gravelly fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	38-72	Silt loam, gravelly loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
ToB, ToC, ToD---- Towerville	0-12	Silt loam--------	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	80-95	75-90	55-85	30-80	25-40	5-20
	12-22	Silt loam, channery loam, channery silty clay loam.	SC, GC, CL, CL-ML	A-4, A-6	5-15	70-95	65-90	55-84	40-80	25-40	5-20
	22-30	Very channery silt loam, loam, channery silty clay loam.	GC, CL, SC, CL-ML	A-4, A-6	5-15	65-95	60-90	50-85	35-80	25-40	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ToE------------- Towerville	0-12	Silt loam--------	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	80-95	75-90	55-85	30-80	25-40	5-20
	12-22	Silt loam, channery loam, channery silty clay loam.	SC, GC, CL, CL-ML	A-4, A-6	5-15	70-95	65-90	55-84	40-80	25-40	5-20
	22-30	Very channery silt loam, loam, channery silty clay loam.	GC, CL, SC, CL-ML	A-4, A-6	5-15	65-95	60-90	50-85	35-80	25-40	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
ToF------------- Towerville	0-12	Silt loam--------	CL, SC, SM-SC, CL-ML	A-2, A-4, A-6	0-5	80-95	75-90	55-85	30-80	25-40	5-20
	12-22	Silt loam, channery loam, channery silty clay loam.	SC, GC, CL, CL-ML	A-4, A-6	5-15	70-95	65-90	55-84	40-80	25-40	5-20
	22-30	Very channery silt loam, loam, channery silty clay loam.	GC, CL, SC, CL-ML	A-4, A-6	5-15	65-95	60-90	50-85	35-80	25-40	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ud, Ue. Udorthents											
UnA, UnB, UnC---- Unadilla	0-10	Silt loam--------	ML	A-4	0	100	95-100	90-100	70-90	<35	NP-10
	10-50	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	90-100	70-90	<25	NP-10
	50-72	Very gravelly sand, gravelly sand, fine sandy loam.	GM, GP, SM, SP	A-2, A-1, A-3	0-10	35-100	25-95	10-70	1-40	---	NP
Ur*. Urban land											

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
VaB, VaC, VaD, VaE, VaF, VcC---Valois	0-6	Gravelly silt loam.	ML, GM, SM, GM-GC	A-4, A-2, A-1	0-5	55-80	50-75	35-75	20-70	20-40	1-12
	6-45	Gravelly loam, gravelly silt loam, gravelly sandy loam.	GM, ML, SM, GM-GC	A-4, A-2, A-1	0-10	55-95	50-90	35-90	20-80	15-25	NP-5
	45-72	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loamy sand, very gravelly loam.	GM, GW-GM, GW, GM-GC	A-1, A-2, A-4	0-15	20-60	15-55	10-50	4-40	15-25	NP-7
VoA, VoB, VoC----Volusia	0-9	Channery silt loam.	GC, SC, CL, CL-ML	A-4	5-10	70-85	65-80	55-80	40-70	15-25	5-10
	9-15	Channery silt loam, channery loam, silt loam.	CL-ML, CL, GM-GC, SC	A-4	5-10	65-90	60-85	50-85	35-75	15-25	5-10
	15-42	Channery silt loam, channery loam, silty clay loam.	SM-SC, CL, SC, CL-ML	A-4	10-25	75-90	70-85	60-85	40-80	20-30	5-10
	42-72	Very channery loam, channery loam, silt loam.	GM-GC, SC, CL, CL-ML	A-2, A-4, A-1	10-25	40-90	35-85	30-85	20-75	20-30	5-10
Wa---------------Wakeville	0-7	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	70-90	15-35	2-15
	7-42	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	65-90	15-35	2-15
	42-72	Silt loam, fine sandy loam, gravelly very fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6, A-2	0-5	75-100	70-100	50-100	30-90	<25	NP-15
Wy---------------Wayland	0-6	Silt loam--------	ML, OL	A-7, A-5	0	100	95-100	90-100	70-95	40-50	5-15
	6-72	Silt loam, silty clay loam.	ML, CL-ML, CL	A-6, A-7, A-7, A-4	0	100	95-100	90-100	70-95	25-45	5-15

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ad-----Alden	0-9	15-27	1.10-1.40	0.6-2.0	0.16-0.22	5.1-7.3	Low	0.37	5	10-25
	9-35	18-35	1.20-1.50	0.2-0.6	0.14-0.20	5.6-7.3	Low	0.37		
	35-72	18-35	1.50-1.80	0.06-0.6	0.08-0.15	6.1-8.4	Low	0.28		
AlA, AlB-----Allard	0-8	2-6	1.20-1.50	0.6-2.0	0.16-0.21	4.5-6.0	Low	0.49	3	2-7
	8-30	1-6	1.20-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.64		
	30-72	1-3	1.45-1.65	>6.0	0.01-0.03	5.1-7.3	Low	0.17		
As-----Ashville	0-9	15-27	1.10-1.40	0.6-2.0	0.16-0.22	5.1-7.3	Low	0.37	5	4-8
	9-36	18-35	1.20-1.50	0.2-0.6	0.14-0.20	5.6-7.3	Low	0.37		
	36-72	18-35	1.50-1.80	0.06-0.6	0.11-0.18	5.6-8.4	Low	0.28		
BrA, BrB-----Barcelona	0-9	15-25	1.20-1.50	0.6-2.0	0.17-0.20	5.6-7.3	Low	0.49	3	2-6
	9-29	18-35	1.20-1.50	0.2-0.6	0.16-0.20	5.6-7.8	Low	0.43		
	29-51	18-35	1.45-1.65	0.2-2.0	0.08-0.14	5.6-7.8	Low	0.28		
	51	---	---	---	---	---	-------	----		
BsA, BsB, BsC-----Busti	0-8	6-18	1.10-1.40	0.2-2.0	0.13-0.20	5.6-6.5	Low	0.32	3	2-6
	8-12	6-18	1.10-1.40	0.2-2.0	0.13-0.20	5.6-6.5	Low	0.32		
	12-27	6-18	1.20-1.50	0.2-2.0	0.08-0.15	5.6-6.5	Low	0.24		
	27-72	6-18	1.40-1.70	0.06-0.6	0.08-0.14	5.6-6.5	Low	0.24		
Ca-----Canadice	0-9	20-40	1.35-1.55	0.2-2.0	0.17-0.21	4.5-6.5	Moderate	0.49	5	3-11
	9-40	35-60	1.40-1.75	<0.06	0.12-0.17	5.1-7.8	Moderate	0.28		
	40-72	35-60	1.40-1.50	<0.06	0.13-0.17	6.6-8.4	Moderate	0.28		
Cb-----Canandaigua	0-10	18-35	1.00-1.25	0.6-2.0	0.20-0.35	5.6-7.8	Low	0.49	5	4-15
	10-45	18-35	1.20-1.40	0.2-0.6	0.19-0.20	6.1-7.8	Low	0.49		
	45-72	10-27	1.60-1.85	0.2-0.6	0.10-0.15	6.6-8.4	Low	0.28		
Cc-----Canandaigua	0-10	18-35	1.00-1.25	0.6-2.0	0.25-0.40	5.6-7.8	Low	0.49	5	10-20
	10-45	18-35	1.20-1.40	0.2-0.6	0.19-0.20	6.1-7.8	Low	0.49		
	45-72	18-35	1.15-1.40	0.2-0.6	0.19-0.21	6.6-8.4	Low	0.64		
CdB, CdC-----Canaseraga	0-2	10-18	1.10-1.40	0.6-2.0	0.17-0.21	4.5-6.0	Low	0.49	3	2-4
	2-23	10-18	1.20-1.50	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.64		
	23-55	10-27	1.70-2.00	<0.2	0.02-0.04	5.1-7.3	Low	0.28		
	55-72	10-27	1.65-1.95	<0.2	0.02-0.04	5.6-8.4	Low	0.28		
Ce-----Carlisle	0-90	---	0.13-0.23	0.2-6.0	0.35-0.45	4.5-7.8	-------	----	5	>70
CfC, CfD-----Carrollton	0-4	15-27	1.25-1.50	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.37	3	3-7
	4-27	18-35	1.35-1.65	0.6-2.0	0.10-0.17	4.5-5.5	Low	0.24		
	27	---	---	---	---	---	-------	----		
ChB, ChC, ChD, ChE, ChF-----Chadakoin	0-4	6-18	1.10-1.40	0.6-2.0	0.12-0.21	4.5-6.0	Low	0.32	3	2-6
	4-24	6-18	1.20-1.50	0.6-2.0	0.08-0.16	4.5-6.0	Low	0.24		
	24-43	6-18	1.40-1.60	0.2-2.0	0.07-0.14	4.5-6.0	Low	0.24		
	43-72	6-18	1.40-1.70	0.2-2.0	0.07-0.14	5.1-6.5	Low	0.24		
CkB, CkC, CkD-----Chautauqua	0-7	6-18	1.10-1.40	0.6-2.0	0.13-0.20	5.1-6.5	Low	0.32	3	2-6
	7-34	6-18	1.20-1.50	0.6-2.0	0.08-0.15	5.1-6.5	Low	0.24		
	34-72	6-18	1.40-1.70	0.2-0.6	0.08-0.14	5.1-6.5	Low	0.24		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ClA, ClB---------Chenango	0-6	6-18	1.20-1.50	0.6-6.0	0.11-0.19	4.5-6.0	Low----------	0.32	3	2-6
	6-45	6-18	1.25-1.55	0.6-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
	45-72	1-8	1.45-1.65	6.0-20.0	0.01-0.05	5.1-7.8	Low----------	0.17		
CnA, CnB, CnC, CnD, CnE--------Chenango	0-6	6-18	1.20-1.50	0.6-6.0	0.08-0.16	4.5-6.0	Low----------	0.24	3	2-6
	6-45	6-18	1.25-1.55	0.6-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
	45-72	1-8	1.45-1.65	6.0-20.0	0.01-0.05	5.1-7.8	Low----------	0.17		
CoA, CoB---------Chenango	0-6	6-18	1.20-1.50	0.6-6.0	0.08-0.16	4.5-6.0	Low----------	0.24	3	2-6
	6-45	6-18	1.25-1.55	0.6-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
	45-72	4-18	1.45-1.65	6.0-20	0.04-0.11	5.1-7.8	Low----------	0.17		
CpA, CpB, CpC----Churchville	0-7	15-35	1.00-1.25	0.6-2.0	0.16-0.21	5.6-7.3	Low----------	0.49	3	2-6
	7-33	40-60	1.20-1.40	<0.2	0.13-0.17	6.1-7.8	Moderate-----	0.28		
	33-72	15-40	1.50-1.80	<0.2	0.07-0.17	7.4-8.4	Low----------	0.28		
CsB, CsC---------Collamer	0-7	15-27	1.20-1.50	0.6-2.0	0.14-0.21	5.1-7.3	Low----------	0.49	3	2-5
	7-21	15-27	1.20-1.50	0.6-2.0	0.14-0.20	5.1-7.3	Low----------	0.49		
	21-45	18-35	1.20-1.50	0.06-0.6	0.16-0.20	5.6-7.8	Low----------	0.49		
	45-72	4-27	1.45-1.65	0.06-0.6	0.12-0.20	6.1-8.4	Low----------	0.64		
CvB, CvC---------Colonie	0-9	1-2	1.20-1.50	2.0-20	0.09-0.10	5.1-6.5	Low----------	0.17	4	1-2
	9-45	1-2	1.20-1.50	2.0-20	0.06-0.08	5.1-6.5	Low----------	0.17		
	45-72	1-2	1.45-1.65	2.0-20	0.04-0.07	5.6-7.3	Low----------	0.17		
DaA, DaB---------Dalton	0-9	10-18	1.10-1.40	0.6-2.0	0.17-0.21	4.5-6.0	Low----------	0.49	3	2-4
	9-23	10-18	1.20-1.50	0.6-2.0	0.16-0.20	4.5-6.0	Low----------	0.64		
	23-72	10-27	1.70-2.00	<0.2	0.02-0.04	5.1-7.8	Low----------	0.28		
DeA, DeB, DeC----Darien	0-9	15-35	1.10-1.40	0.6-2.0	0.15-0.20	5.6-7.3	Low----------	0.37	3	3-8
	9-31	28-35	1.50-1.75	0.2-0.6	0.09-0.16	6.1-7.3	Moderate-----	0.24		
	31-72	20-35	1.50-1.85	0.06-0.2	0.05-0.14	7.4-8.4	Low----------	0.24		
DkD, DkE---------Dunkirk	0-6	10-25	1.35-1.55	0.6-2.0	0.16-0.21	5.1-7.3	Low----------	0.49	3	3-6
	6-12	10-25	1.40-1.70	0.6-2.0	0.16-0.20	5.1-7.3	Low----------	0.49		
	12-38	18-35	1.40-1.75	0.2-0.6	0.16-0.20	5.6-7.8	Low----------	0.49		
	38-72	5-35	1.40-1.65	0.2-0.6	0.12-0.20	6.1-8.4	Low----------	0.64		
ElA, ElB---------Elnora	0-9	2-10	1.20-1.50	2.0-6.0	0.08-0.16	3.6-6.5	Low----------	0.17	4	2-6
	9-30	2-5	1.20-1.50	6.0-20	0.06-0.08	3.6-6.5	Low----------	0.17		
	30-72	2-5	1.45-1.65	6.0-20	0.03-0.06	5.1-7.3	Low----------	0.17		
ErA, ErB, ErC----Erie	0-12	15-27	1.10-1.40	0.6-2.0	0.12-0.19	4.5-6.0	Low----------	0.32	3	3-7
	12-15	10-18	1.20-1.50	0.6-2.0	0.09-0.16	5.1-6.5	Low----------	0.24		
	15-35	10-30	1.70-2.00	<0.2	0.01-0.03	5.1-7.8	Low----------	0.24		
	35-72	10-30	1.65-1.95	<0.2	0.01-0.03	5.6-8.4	Low----------	0.24		
Fe*:										
Fluvaquents.										
Udifluvents.										
FmA, FmB, FmC, FmD-------------Fremont	0-8	15-35	1.10-1.40	0.6-2.0	0.17-0.21	4.5-6.0	Low----------	0.37	3	3-8
	8-35	18-35	1.20-1.50	0.2-2.0	0.12-0.19	4.5-6.0	Low----------	0.32		
	35-72	18-35	1.40-1.65	<0.2	0.08-0.14	5.1-7.3	Low----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
FrB, FrC: Frewsburg	0-7	10-27	1.25-1.50	0.6-2.0	0.15-0.23	4.5-5.5	Low	0.37	3	3-7
	7-17	15-30	1.40-1.65	0.6-2.0	0.12-0.19	4.5-5.5	Low	0.24		
	17-38	18-35	1.35-1.65	0.2-0.6	0.09-0.15	4.5-5.5	Low	0.24		
	38	---	---	---	---	---	-------------	----		
Ge: Getzville	0-10	18-35	1.20-1.50	0.2-2.0	0.15-0.22	5.1-7.3	Low	0.49	3	4-10
	10-22	18-35	1.20-1.50	0.2-2.0	0.15-0.20	5.6-7.3	Low	0.43		
	22-72	0-10	1.45-1.65	2.0-6.0	0.02-0.08	6.6-8.4	Low	0.17		
Ha: Halsey	0-9	7-25	0.50-1.00	0.6-2.0	0.20-0.25	5.6-7.3	Low	0.24	5	10-25
	9-26	7-18	1.20-1.40	0.6-6.0	0.12-0.18	5.6-7.3	Low	0.24		
	26-72	2-10	1.40-1.60	6.0-20	0.02-0.07	6.1-8.4	Low	0.10		
He: Hamlin	0-8	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low	0.49	5	2-6
	8-31	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.3	Low	0.49		
	31-38	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.6-7.8	Low	0.49		
	38-72	3-10	1.25-1.55	0.6-2.0	0.17-0.19	5.6-7.8	Low	0.49		
Hm: Henrietta	0-12	---	0.22-0.52	0.2-6.0	0.35-0.45	5.6-7.8	-------------	----	5	42-64
	12-35	5-18	1.45-1.80	0.6-2.0	0.09-0.22	5.6-7.8	Low	0.28		
	35-72	5-18	1.45-1.80	0.6-2.0	0.08-0.22	7.9-8.4	Low	0.28		
HnA, HnB, HnC: Hinesburg	0-9	1-5	1.20-1.50	6.0-20	0.10-0.16	5.6-6.5	Low	0.24	3	3-6
	9-32	1-5	1.30-1.50	6.0-20	0.04-0.10	5.6-6.5	Low	0.24		
	32-72	3-16	1.30-1.70	0.2-0.6	0.18-0.22	5.1-7.3	Low	0.43		
Ho: Holderton	0-10	5-18	1.15-1.40	0.6-2.0	0.18-0.21	5.6-7.3	Low	0.28	5	2-6
	10-38	5-18	1.15-1.45	0.6-2.0	0.10-0.20	5.6-7.3	Low	0.28		
	38-72	1-10	1.25-1.55	0.6-6.0	0.01-0.10	6.1-7.8	Low	0.20		
HrA, HrB, HrC, HrD: Hornell	0-8	18-40	1.10-1.40	0.6-2.0	0.16-0.21	3.6-5.5	Low	0.43	3	3-7
	8-36	35-60	1.20-1.50	<0.2	0.11-0.13	4.5-5.5	Moderate	0.28		
	36	---	---	---	---	---	-------------	----		
IvB: Ivory	0-5	15-35	1.20-1.40	0.2-0.6	0.18-0.22	4.5-6.0	Low	0.49	3	3-7
	5-15	35-60	1.30-1.55	0.2-0.6	0.10-0.14	4.5-6.0	Moderate	0.28		
	15-35	35-60	1.30-1.55	0.06-0.2	0.07-0.16	4.5-6.0	Moderate	0.28		
	35-72	35-60	1.50-1.75	0.06-0.2	0.05-0.15	4.5-6.0	Moderate	0.28		
	72	---	---	---	---	---	-------------	----		
KnE: Kinzua	0-3	10-27	1.25-1.50	0.6-2.0	0.13-0.24	4.5-5.5	Low	0.28	3	3-7
	3-42	18-35	1.40-1.70	0.6-2.0	0.08-0.13	4.5-5.5	Low	0.24		
	42-72	18-35	1.60-1.80	0.2-0.6	0.10-0.16	4.5-5.5	Low	0.24		
La: Lamson	0-8	5-18	1.10-1.40	0.6-6.0	0.15-0.22	5.6-7.8	Low	0.28	5	3-10
	8-37	5-18	1.25-1.55	0.6-6.0	0.12-0.17	6.1-8.4	Low	0.20		
	37-72	1-10	1.45-1.65	0.6-6.0	0.02-0.04	6.1-8.4	Low	0.20		
LnB, LnC: Langford	0-9	10-22	1.10-1.40	0.6-2.0	0.12-0.19	5.1-7.3	Low	0.28	3	3-9
	9-21	10-18	1.20-1.50	0.6-2.0	0.08-0.14	5.1-7.3	Low	0.28		
	21-45	10-18	1.70-2.00	<0.2	0.01-0.03	5.6-7.3	Low	0.28		
	45-72	10-18	1.65-1.95	<0.2	0.01-0.03	5.6-8.4	Low	0.28		
MdB, MdC, MdD: Mardin	0-14	10-18	1.10-1.40	0.6-2.0	0.11-0.17	3.6-6.5	Low	0.24	3	3-7
	14-18	10-18	1.20-1.50	0.6-2.0	0.09-0.16	3.6-6.5	Low	0.24		
	18-45	10-18	1.70-2.00	<0.2	0.01-0.03	4.5-7.3	Low	0.24		
	45-72	10-18	1.65-1.95	<0.2	0.01-0.03	5.1-8.4	Low	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Me---------------Middlebury	0-6	5-18	1.15-1.40	0.6-2.0	0.14-0.21	5.1-6.5	Low-----------	0.28	5	3-7
	6-43	5-18	1.15-1.45	0.6-2.0	0.10-0.20	5.6-7.3	Low-----------	0.28		
	43-72	1-10	1.25-1.55	2.0-20.0	0.01-0.10	5.6-7.3	Low-----------	0.20		
Mn---------------Minoa	0-5	5-18	1.20-1.50	0.6-2.0	0.16-0.20	5.1-7.3	Low-----------	0.28	4	3-6
	5-35	5-18	1.20-1.50	0.6-2.0	0.13-0.20	5.1-7.3	Low-----------	0.32		
	35-48	3-15	1.20-1.50	0.6-2.0	0.13-0.20	5.6-7.3	Low-----------	0.24		
	48-72	3-15	1.20-1.50	0.6-6.0	0.07-0.20	5.6-8.4	Low-----------	0.24		
NgA, NgB---------Niagara	0-15	15-25	1.20-1.50	0.6-2.0	0.17-0.22	5.1-7.3	Low-----------	0.49	3	2-6
	15-26	18-35	1.20-1.50	0.2-0.6	0.16-0.20	5.6-7.8	Low-----------	0.49		
	26-60	5-35	1.45-1.65	0.2-0.6	0.12-0.20	6.6-8.4	Low-----------	0.64		
	60-72	8-35	1.70-1.95	0.06-0.6	0.08-0.13	6.6-8.4	Low-----------	0.28		
OnD--------------Onoville	0-2	10-27	1.25-1.50	0.6-2.0	0.16-0.24	4.5-5.5	Low-----------	0.37	3	3-7
	2-17	18-35	1.35-1.65	0.6-2.0	0.12-0.19	4.5-5.5	Moderate-----	0.24		
	17-38	18-35	1.65-1.85	0.06-0.6	0.07-0.11	4.5-5.5	Moderate-----	0.24		
	38-72	18-35	1.55-1.80	0.06-0.6	0.09-0.12	4.5-6.0	Moderate-----	0.24		
OrA, OrB, OrC, OrD-------------Orpark	0-7	18-35	1.10-1.40	0.6-2.0	0.14-0.21	4.5-5.5	Low-----------	0.37	3	3-7
	7-26	18-35	1.20-1.60	0.06-0.6	0.14-0.20	4.5-5.5	Low-----------	0.32		
	26	---	---	---	---	---	-------------	----		
Pa---------------Palms	0-36	---	0.30-0.55	0.2-6.0	0.35-0.45	5.1-7.8	-------------	----	5	>75
	36-72	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low-----------	0.37		
Pg*--------------Pits	0-6	0-1	---	>6.0	0.01-0.02	---	Low-----------	0.02	---	<.1
	6-60	0-1	---	>6.0	0.01-0.02	---	Low-----------	0.02		
Po---------------Pompton	0-10	8-18	1.15-1.45	0.6-6.0	0.14-0.18	4.5-6.0	Low-----------	0.24	3	2-4
	10-34	10-18	1.50-1.65	0.6-6.0	0.12-0.16	4.5-5.5	Low-----------	0.24		
	34-72	2-12	1.45-1.70	>6.0	0.05-0.10	4.5-5.5	Low-----------	0.17		
RaA, RaB---------Raynham	0-7	3-16	1.20-1.50	0.2-2.0	0.18-0.24	5.1-7.3	Low-----------	0.49	3	3-10
	7-24	3-16	1.20-1.50	0.2-2.0	0.18-0.22	5.1-7.3	Low-----------	0.64		
	24-72	3-16	1.20-1.60	0.06-0.2	0.17-0.21	5.6-7.8	Low-----------	0.64		
Rf---------------Raynham	0-7	3-16	1.20-1.50	0.6-2.0	0.20-0.30	5.1-7.3	Low-----------	0.49	3	3-10
	7-24	3-16	1.20-1.50	0.2-2.0	0.18-0.26	5.1-7.3	Low-----------	0.64		
	24-72	3-16	1.20-1.50	0.06-0.2	0.18-0.22	5.6-7.8	Low-----------	0.64		
Rh---------------Red Hook	0-10	8-18	1.10-1.40	0.6-2.0	0.14-0.19	5.1-6.5	Low-----------	0.32	3	3-12
	10-32	5-18	1.25-1.55	0.6-2.0	0.04-0.17	5.6-7.3	Low-----------	0.24		
	32-72	5-18	1.45-1.65	0.2-2.0	0.04-0.11	5.6-7.8	Low-----------	0.17		
RnA--------------Rhinebeck	0-15	15-40	1.00-1.25	0.2-0.6	0.16-0.21	5.1-7.3	Moderate-----	0.49	3	3-7
	15-44	35-60	1.20-1.40	0.06-0.2	0.12-0.14	5.1-7.8	Moderate-----	0.28		
	44-72	1-5	1.45-1.65	0.06-0.2	0.12-0.15	6.1-8.4	Low-----------	0.28		
RoF*:										
Rock outcrop----	0-60	---	---	---	---	---	-------------	----	---	---
Manlius---------	0-3	6-18	1.10-1.40	0.6-2.0	0.10-0.18	3.6-6.0	Low-----------	0.28	3	1-5
	3-21	6-18	1.20-1.50	0.6-2.0	0.08-0.12	3.6-6.0	Low-----------	0.20		
	21-25	6-18	1.70-1.95	0.6-2.0	0.03-0.09	4.5-6.5	Low-----------	0.20		
	25	---	---	---	---	---	-------------	----		
Sa*: Saprists.										

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Sa*: Aquents.										
ShB, ShC, ShD, ShE, ShF-------- Schuyler	0-9	15-27	1.10-1.40	0.6-2.0	0.12-0.19	3.6-6.0	Low----------	0.37	3	3-8
	9-29	18-35	1.20-1.50	0.2-2.0	0.11-0.18	3.6-6.0	Low----------	0.37		
	29-72	18-35	1.70-1.95	0.06-0.2	0.09-0.18	3.6-6.0	Low----------	0.28		
SoA, SoB--------- Scio	0-9	2-15	1.20-1.50	0.6-2.0	0.18-0.21	4.5-6.0	Low----------	0.49	3	2-8
	9-48	2-15	1.20-1.50	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.64		
	48-72	0-5	1.45-1.65	2.0-20.0	0.02-0.19	5.1-7.8	Low----------	0.17		
Sw--------------- Swormville	0-10	18-35	1.20-1.50	0.2-0.6	0.17-0.22	5.1-7.3	Low----------	0.49	3	3-6
	10-25	18-35	1.55-1.70	0.06-0.6	0.15-0.17	5.6-7.3	Low----------	0.43		
	25-30	5-20	1.60-1.75	2.0-6.0	0.03-0.08	6.1-7.8	Low----------	0.17		
	30-72	0-10	1.60-1.75	2.0-6.0	0.02-0.08	6.6-8.4	Low----------	0.17		
Te--------------- Teel	0-6	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.1-7.3	Low----------	0.49	5	2-6
	6-28	5-18	1.15-1.45	0.6-2.0	0.17-0.19	5.1-7.3	Low----------	0.49		
	28-72	3-10	1.25-1.55	0.6-2.0	0.12-0.12	5.6-7.8	Low----------	0.49		
Tg--------------- Tioga	0-11	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low----------	0.37	5	2-6
	11-38	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low----------	0.28		
	38-72	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low----------	0.28		
ToB, ToC, ToD---- Towerville	0-12	15-35	1.10-1.40	0.6-2.0	0.12-0.19	4.5-6.0	Low----------	0.37	3	3-8
	12-22	18-35	1.20-1.50	0.6-2.0	0.11-0.18	4.5-6.0	Low----------	0.28		
	22-30	18-35	1.60-1.80	0.06-0.6	0.09-0.18	5.1-6.5	Low----------	0.28		
	30	---	---	---	---	---	-------------	----		
ToE-------------- Towerville	0-12	15-35	1.10-1.40	0.6-2.0	0.12-0.19	4.5-6.0	Low----------	0.37	3	3-8
	12-22	18-35	1.20-1.50	0.6-2.0	0.11-0.18	4.5-6.0	Low----------	0.28		
	22-30	18-35	1.60-1.80	0.06-0.6	0.09-0.18	5.1-6.5	Low----------	0.28		
	30	---	---	---	---	---	-------------	----		
ToF-------------- Towerville	0-12	15-35	1.10-1.40	0.6-2.0	0.12-0.19	4.5-6.0	Low----------	0.37	3	3-8
	12-22	18-35	1.20-1.50	0.6-2.0	0.11-0.18	4.5-6.0	Low----------	0.28		
	22-30	18-35	1.60-1.80	0.06-0.6	0.09-0.18	5.1-6.5	Low----------	0.28		
	30	---	---	---	---	---	-------------	----		
Ud, Ue. Udorthents										
UnA, UnB, UnC---- Unadilla	0-10	2-18	1.20-1.50	0.6-2.0	0.18-0.21	4.5-6.0	Low----------	0.49	3	2-7
	10-50	1-18	1.20-1.50	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.64		
	50-72	1-3	1.45-1.65	2.0-20.0	0.01-0.10	5.1-7.8	Low----------	0.17		
Ur*. Urban land										
VaB, VaC, VaD, VaE, VaF, VcC--- Valois	0-6	6-18	1.10-1.40	0.6-2.0	0.08-0.16	3.6-6.0	Low----------	0.24	3	2-6
	6-45	6-18	1.20-1.50	0.6-2.0	0.07-0.14	3.6-6.0	Low----------	0.24		
	45-72	4-10	1.40-1.60	0.6-6.0	0.03-0.09	4.5-7.3	Low----------	0.24		
VoA, VoB, VoC---- Volusia	0-9	18-27	1.10-1.40	0.6-2.0	0.11-0.17	4.5-6.5	Low----------	0.24	3	2-7
	9-15	18-27	1.30-1.60	0.6-2.0	0.09-0.16	4.5-6.5	Low----------	0.24		
	15-42	15-35	1.70-2.00	<0.2	0.01-0.02	5.1-7.3	Low----------	0.24		
	42-72	15-27	1.65-1.95	<0.2	0.01-0.02	5.6-8.4	Low----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Wa---------------- Wakeville	0-7	8-18	1.15-1.40	0.6-2.0	0.18-0.21	5.6-7.3	Low----------	0.49	5	2-6
	7-42	5-18	1.15-1.45	0.6-2.0	0.18-0.19	5.6-7.3	Low----------	0.49		
	42-72	3-18	1.25-1.55	0.6-2.0	0.12-0.19	6.1-8.4	Low----------	0.49		
Wy---------------- Wayland	0-6	15-35	1.05-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low----------	0.43	5	3-6
	6-72	18-35	1.10-1.60	0.06-0.2	0.16-0.20	5.1-8.4	Low----------	0.43		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
Ad: Alden	D	None	---	---	+1-0.5	Apparent	Nov-Jun	>60	---	High	High	Low.
AlA, AlB: Allard	B	None	---	---	>6.0	---	---	>60	---	High	Low	Moderate.
As: Ashville	D	None	---	---	0-1.0	Apparent	Nov-May	>60	---	High	High	Low.
BrA, BrB: Barcelona	C	None	---	---	0.5-1.5	Apparent	Dec-May	40-60	Soft	High	High	Low.
BsA, BsB, BsC: Busti	C	None	---	---	0.5-1.5	Perched	Nov-Apr	>60	---	High	High	Low.
Ca: Canadice	D	None	---	---	0-1.0	Apparent	Dec-Jun	>60	---	Moderate	High	Low.
Cb, Cc: Canandaigua	D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Low.
CdB, CdC: Canaseraga	C	None	---	---	1.5-4.0	Perched	Mar-May	>60	---	High	Moderate	Moderate.
Ce: Carlisle	A/D	None	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.
CfC, CfD: Carrollton	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High	High.
ChB, ChC, ChD, ChE, ChF: Chadakoin	B	None	---	---	3.0-6.0	---	---	>60	---	Moderate	Low	High.
CkB, CkC, CkD: Chautauqua	C	None	---	---	1.5-2.0	Perched	Nov-Apr	>60	---	Moderate	Moderate	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
ClA, ClB, CnA, CnB, CnC, CnD, CnE: Chenango	A	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
CoA, CoB: Chenango	A	Rare	---	---	3.0-6.0	Apparent	Apr-May	>60	---	Moderate	Low	Moderate.
CpA, CpB, CpC: Churchville	D	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Low.
CsB, CsC: Collamer	C	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Low.
CvB, CvC: Colonie	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Moderate.
DaA, DaB: Dalton	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Moderate.
DeA, DeB, DeC: Darien	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Low.
DkD, DkE: Dunkirk	B	None	---	---	>6.0	---	---	>60	---	High	Low	Low.
ElA, ElB: Elnora	B	None	---	---	1.5-2.0	Apparent	Feb-May	>60	---	Moderate	Low	Moderate.
ErA, ErB, ErC: Erie	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	Low.
Fe*:												
Fluvaquents.												
Udifluvents.												
FmA, FmB, FmC, FmD: Fremont	C	None	---	---	0.5-1.5	Perched	Dec-May	>60	---	High	High	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
FrB, FrC----------- Frewsburg	C	None---------	---	---	0.5-1.5	Perched	Nov-May	20-40	Soft	High-----	High-----	High.
Ge----------------- Getzville	D	Rare---------	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
Ha----------------- Halsey	C/D	Rare---------	---	---	+1-0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
He----------------- Hamlin	B	Occasional	Brief-----	Nov-May	3.0-6.0	Apparent	Nov-May	>60	---	High-----	Low------	Low.
Hm----------------- Henrietta	B/D	None---------	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
HnA, HnB, HnC----- Hinesburg	C	None---------	---	---	1.5-2.5	Perched	Nov-May	>60	---	Moderate	Low------	Moderate.
Ho----------------- Holderton	B	Occasional	Brief-----	Nov-May	0.5-1.5	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
HrA, HrB, HrC, HrD-------------- Hornell	D	None---------	---	---	0.5-1.5	Perched	Dec-May	20-40	Soft	High-----	High-----	High.
IvB---------------- Ivory	C	None---------	---	---	0.5-1.5	Perched	Oct-May	>60	---	High-----	High-----	High.
KnE---------------- Kinzua	B	None---------	---	---	4.0-6.0	Apparent	Nov-Apr	>60	---	Moderate	High-----	High.
La----------------- Lamson	B/D	None---------	---	---	+1-0.5	Apparent	Dec-May	>60	---	High-----	High-----	Low.
LnB, LnC----------- Langford	C	None---------	---	---	1.5-2.0	Perched	Mar-May	>60	---	High-----	Moderate	Low.
MdB, MdC, MdD----- Mardin	C	None---------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Me: Middlebury	B	Occasional	Brief	Nov-May	0.5-2.0	Apparent	Feb-Apr	>60	---	High	Moderate	Low.
Mn: Minoa	C	None	---	---	0.5-1.5	Apparent	Feb-Apr	>60	---	High	Moderate	Moderate.
NgA, NgB: Niagara	C	None	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High	High	Low.
OnD: Onoville	C	None	---	---	1.5-2.0	Perched	Nov-May	>60	---	High	High	High.
OrA, OrB, OrC, OrD: Orpark	C	None	---	---	0.5-1.5	Perched	Nov-May	20-40	Soft	High	High	High.
Pa: Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	>60	---	High	High	Moderate.
Pg*: Pits	A	None	---	---	>6.0	---	---	>60	---	---	---	---
Po: Pompton	B	None	---	---	0.5-2.0	Apparent	Oct-May	>60	---	High	Moderate	High.
RaA, RaB: Raynham	C	None	---	---	0.5-2.0	Apparent	Nov-May	>60	---	High	High	Moderate.
Rf: Raynham	C	Occasional	Brief	Mar-May	0.5-2.0	Apparent	Nov-May	>60	---	High	High	Moderate.
Rh: Red Hook	C	None	---	---	0.5-1.5	Apparent	Dec-May	>60	---	High	High	Moderate.
RnA: Rhinebeck	D	None	---	---	0.5-1.5	Perched	Jan-May	>60	---	High	High	Low.
RoF*: Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
RoF*:												
Manlius	C	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	Moderate.
Sa*:												
Saprists.												
Aquents.												
ShB, ShC, ShD, ShE, ShF Schuyler	B	None	---	---	1.5-2.0	Perched	Mar-May	>60	---	High	Moderate	High.
SoA, SoB Scio	B	None	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High	Moderate	Moderate.
Sw Swormville	C	None	---	---	0.5-1.5	Apparent	Nov-May	>60	---	High	High	Low.
Te Teel	B	Occasional	Brief	Nov-May	1.5-2.0	Apparent	Jan-May	>60	---	High	Moderate	Low.
Tg Tioga	B	Rare	---	---	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Moderate.
ToB, ToC, ToD, ToE, ToF Towerville	B	None	---	---	1.5-2.0	Perched	Dec-May	20-40	Hard	High	Moderate	High.
Ud, Ue. Udorthents												
UnA, UnB, UnC Unadilla	B	None	---	---	>6.0	---	---	>60	---	High	Low	Moderate.
Ur*. Urban land												
VaB, VaC, VaD, VaE, VaF, VcC Valois	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
VoA, VoB, VoC----- Volusia	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Moderate.
Wa---------------- Wakeville	B	Occasional	Brief-----	Nov-May	0.5-1.5	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
Wy---------------- Wayland	C/D	Frequent----	Brief or long.	Nov-Jun	+.5-1.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. LL means liquid limit; PI, plasticity index; MD, maximum dry density; OM, optimum moisture; and LS, linear shrinkage)

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											LL	PI	Moisture density		LS
			>3 inch	Percentage passing sieve--							Percentage smaller than--							
	AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			MD	OM	
			Pct											Pct		Lb/ cu ft	Pct	Pct
Ashville silt loam:* (S83NY-013-018)																		
Ap----- 0 to 11	A-5	OL	100	---	---	---	99	98	94	88	51	22	12	47	8	87	30	5.0
Bw1---- 14 to 21	A-4	CL-ML	100	---	98	96	94	93	90	86	39	45	11	27	6	112	16	3.0
BC----- 21 to 38	A-4	CL	100	---	94	86	80	75	70	66	37	18	12	29	10	121	12	5.0
2C----- 38 to 45	A-4	SC	100	---	88	76	68	60	53	50	31	16	11	29	10	128	9	6.0
Busti silt loam:* (S83NY-013-015)																		
Ap----- 0 to 10	A-4	ML	100	---	93	87	81	77	73	67	31	13	6	40	10	99	20	5.0
E------ 10 to 16	A-4	CL-ML	100	98	90	84	80	76	71	65	27	12	7	25	4	115	14	2.0
Bw----- 16 to 30	A-4	CL-ML	100	99	96	91	86	80	74	68	27	13	10	25	4	119	13	3.0
CB----- 30 to 53	A-4	CL-ML	100	97	84	77	72	66	59	53	28	13	9	24	6	125	11	4.0
C------ 53 to 60	A-4	CL-ML	100	95	88	82	74	67	59	55	32	18	12	25	7	125	11	4.0
Canandaigua silt loam, loamy substratum:* (S83NY-013-005)																		
Ap----- 0 to 10	A-4	ML	100	---	---	---	---	99	98	87	51	25	13	39	30	93	26	6.0
Bg1---- 10 to 16	A-6	CL	100	---	---	---	---	---	99	94	60	35	24	35	22	104	20	8.0
Bg2---- 16 to 36	A-4	CL	100	---	---	---	99	98	94	81	51	27	17	27	19	115	16	5.0
C1----- 36 to 45	A-4	CL-ML	100	---	---	99	97	93	82	63	41	18	11	22	18	121	12	3.0
2C2---- 45 to 60	A-4	CL-ML	100	---	99	86	90	82	68	51	30	14	8	21	17	124	12	3.0
3C3---- 60 to 72	A-4	SM-SC	100	98	89	82	75	67	55	46	30	14	9	20	16	130	9	3.0

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification: AASHTO	Classification: Unified	Grain-size distribution: >3 inch	Percentage passing sieve--: 2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .02 mm	.005 mm	.002 mm	LL	PI	Moisture density: MD	OM	LS
			Pct											Pct		Lb/ cu ft	Pct	Pct
Erie silt loam:* (S83NY-013-003)																		
Ap----- 0 to 12	A-5	OL	100	---	97	95	94	92	91	85	31	18	90	46	40	81	33	7.0
E------ 12 to 15	A-4	ML	100	---	94	88	83	79	74	64	29	13	80	22	19	119	12	2.0
Bx----- 15 to 28	A-4	ML	100	98	94	91	86	80	69	51	23	14	70	19	16	126	9	3.0
BC----- 28 to 35	A-4	ML	100	---	95	---	---	---	---	---	---	---	---	18	16	126	10	1.0
C1----- 35 to 50	A-4	ML	100	99	96	---	---	---	---	---	---	---	---	19	16	126	9	2.0
C2----- 50 to 70	A-4	CL-ML	100	---	96	---	---	---	---	---	---	---	---	20	16	126	10	3.0
Fremont silt loam:* (S83NY-013-014)																		
Ap----- 0 to 8	A-5	SM	100	95	74	63	57	50	45	37	26	10	5	45	38	98	21	5.0
Bw1---- 8 to 19	A-2-4	GM-GC	100	85	66	56	48	43	38	29	19	12	8	28	21	115	14	3.0
Bw2---- 19 to 35	A-6	CL-ML	100	94	84	81	78	73	65	57	45	29	19	35	25	113	16	6.0
C------ 35 to 60	A-6	CL-ML	100	96	84	81	76	68	58	52	38	23	15	33	22	117	14	7.0
Frewsburg silt loam:* (S83NY-013-013)																		
Ap----- 0 to 7	A-5	ML	100	96	91	87	84	80	72	62	40	20	11	41	8	99	21	6.0
Bw1---- 7 to 13	A-4	CL-ML	100	---	92	88	85	83	77	64	39	23	15	29	0	112	16	6.0
Bw2---- 13 to 17	A-6	CL	100	---	94	92	88	82	72	61	40	25	19	31	11	117	15	8.0
Bt----- 17 to 25	A-4	CL-ML	100	97	88	80	75	72	65	53	34	21	15	31	9	114	15	7.0
BC----- 25 to 38	A-6	CL-ML	100	---	95	90	85	79	72	68	48	30	22	33	9	117	15	6.0
Ivory silty clay loam:* (S83NY-013-012)																		
Ap----- 0 to 5	A-7-5	ML	100	99	96	93	90	89	87	85	55	30	17	49	38	92	27	8.0
BE----- 5 to 12	A-7-6	ML	100	---	97	95	94	91	87	82	58	37	27	42	28	102	22	7.0
BEg---- 12 to 15	A-7-6	MH	100	96	93	92	90	87	84	80	61	42	30	53	31	102	21	8.0
Bt----- 15 to 35	A-6	SM-SC	100	95	79	72	64	57	50	46	32	22	15	39	24	113	17	6.0
C------ 35 to 52	A-6	SM-SC	100	97	85	73	60	51	44	42	31	19	12	35	24	120	13	8.0
Cr----- 52 to 72	A-6	GM-GC	100	88	65	56	46	41	36	35	24	14	9	34	23	122	13	6.0

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification: AASHTO	Classification: Unified	Grain-size distribution: >3 inch	Percentage passing sieve--: 2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	Percentage smaller than--: .02 mm	.005 mm	.002 mm	LL	PI	Moisture density: MD	OM	LS
			Pct											Pct		Lb/ cu ft	Pct	Pct
Langford silt loam:* (S83NY-013-001)																		
Ap----- 0 to 9	A-4	OL	100	---	98	95	90	80	68	57	28	10	6	47	39	92	25	4.0
Bw1---- 9 to 15	A-4	ML	100	---	98	95	90	85	78	67	37	16	8	31	26	102	20	4.0
Bw2---- 15 to 21	A-4	ML	100	---	97	93	88	82	74	62	34	16	11	33	28	110	17	4.0
Bw3---- 21 to 34	A-4	CL-ML	100	---	97	93	90	85	76	59	31	18	12	23	18	118	12	4.0
BC----- 34 to 45	A-4	CL	100	98	94	90	86	80	72	59	34	20	14	23	16	121	11	4.0
C------ 45 to 60	A-4	CL	100	99	---	---	---	---	---	---	---	---	---	23	16	126	11	4.0
Mardin channery silt loam:* (S83NY-013-016)																		
Bw----- 0 to 14	A-4	ML	100	99	93	87	82	77	71	67	35	18	10	31	25	109	18	4.0
Bx1---- 18 to 32	A-4	CL-ML	100	96	88	81	74	69	62	57	35	20	14	27	20	123	11	5.0
Bx2---- 32 to 45	A-4	CL-ML	100	93	84	78	73	68	60	55	31	18	12	25	19	124	11	4.0
C------ 45 to 60	A-4	ML	100	97	88	81	75	69	62	56	33	19	13	26	18	123	11	4.0
Niagara silt loam:* (S83NY-013-006)																		
Ap----- 0 to 12	A-4	ML	100	---	---	---	---	99	94	85	49	26	15	37	29	99	21	3.0
E------ 12 to 15	A-4	CL	100	---	---	---	---	98	94	87	52	29	21	27	20	109	17	5.0
Bt----- 15 to 26	A-6	CL	100	---	---	---	---	99	97	92	61	38	28	31	19	109	19	7.0
BC----- 26 to 37	A-4	CL	100	---	---	99	99	98	97	94	69	40	26	31	20	110	18	6.0
C1----- 37 to 45	A-4	CL-ML	100	---	---	99	97	95	93	88	61	29	18	27	20	114	17	4.0
2C2---- 45 to 51	A-4	CL-ML	100	---	---	99	97	92	81	67	48	22	11	22	17	122	12	3.0
3C3---- 51 to 60	A-4	ML	100	---	96	93	91	87	78	61	36	17	11	20	16	124	11	2.0

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution											LL	PI	Moisture density		LS
				Percentage passing sieve--							Percentage smaller than--							
	AASHTO	Unified	>3 inch	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			MD	OM	
			Pct											Pct		Lb/ cu ft	Pct	Pct
Orpark silt loam:* (S83NY-013-017)																		
BA----- 3 to 7	A-4	ML	100	99	97	94	91	87	80	76	42	19	10	34	29	101	21	4.0
Bw1---- 7 to 13	A-4	CL-ML	100	---	99	96	93	89	84	80	42	19	12	29	22	117	18	4.0
2Bw2--- 13 to 26	A-4	CL-ML	100	98	87	81	76	72	66	60	33	16	10	26	19	119	13	4.0

* Locations of the sampled pedons are as follows:

Ashville silt loam: town of Gerry, 5 feet north of first fenceline north of County Route 603, 30 yards west of Herrick Road.

Busti silt loam: town of Busti, 150 feet north of Garfield Road, 1,600 feet west of the junction of Garfield Road and County Route 125.

Canandaigua silt loam: town of Pomfret, 40 yards south of VanBuren Road, 1/4 mile west of Interstate 90.

Erie silt loam: town of Westfield, 25 yards north of Coon Road, 1/2 mile west of County Route 88.

Fremont silt loam: town of Carroll, 70 feet west and 1/4 mile south of the junction of Bain Road and Austin Road.

Frewsburg silt loam: town of Carroll, 20 feet northwest of the junction of County Route 336 and Town Highway Route 635.

Ivory silty clay loam: town of Carroll, 900 feet east of Oakhill Road, 1,200 feet west of the county line, 20 feet south of Town Highway Route 635.

Langford silt loam: town of Ripley, 0.7 mile east of the junction of Sinden Road and Sulphur Springs Road, 50 yards south of Sulphur Springs Road.

Mardin channery silt loam: town of Ellicott, 0.5 mile south of Salisbury Road, 1.5 miles west of New York Route 60 on north side of logging road.

Niagara silt loam: town of Pomfret, 25 yards north of VanBuren Road, 1/4 mile west of Interstate 90.

Orpark silt loam: town of Ellicott, 1/4 mile east and 20 yards south of the junction of Turner Road and County Route 339.

TABLE 19.--RELATIONSHIP BETWEEN PARENT MATERIAL, LANDSCAPE POSITION, AND DRAINAGE CLASS OF THE SOILS

Soil characteristics and parent material	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON UPLANDS				
Very deep, moderately coarse textured soils that formed in glacial till and that have less than 18 percent clay in the subsoil	Chadakoin	Chautauqua	Busti		
Very deep, moderately fine textured soils that formed in glacial till and that have 18 to 35 percent clay in the subsoil		Schuyler	Fremont	Ashville	Alden
Very deep, moderately fine textured soils that formed in glacial till and that have 27 to 35 percent clay in the subsoil			Darien		
Very deep, moderately fine textured soils that formed in high-lime glacial till and that have a fragipan		Langford	Erie		
Very deep, medium textured soils that formed in low-lime glacial till and that have a fragipan		Mardin	Volusia		
Very deep, medium textured soils that formed in 20 to 40 inches of silty material and the underlying acid glacial till and that have a fragipan		Canaseraga	Dalton		
Moderately deep, moderately fine textured soils that formed in glacial till and that have 18 to 35 percent clay in the subsoil		Towerville	Orpark		
Moderately deep, fine textured soils that formed in glacial till and that have more than 35 percent clay in the subsoil			Hornell		
Very deep, moderately fine textured soils that formed in residue from shale and siltstone, that have 18 to 35 percent clay in the subsoil, and that have a frigid temperature regime	Kinzua				
Very deep, moderately fine textured soils that formed in residuum from shale and siltstone, have 18 to 35 percent clay in the subsoil, have a fragipan, and have a frigid temperature regime		Onoville			

TABLE 19.--RELATIONSHIP BETWEEN PARENT MATERIAL, LANDSCAPE POSITION, AND DRAINAGE CLASS OF THE SOILS--Continued

Soil characteristics and parent material	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON UPLANDS--Continued				
Very deep, fine textured soils that formed in residuum from shale and siltstone, have more than 35 percent clay in the subsoil, and have a frigid temperature regime			Ivory		
Moderately deep, moderately fine textured soils that formed in residuum from shale and siltstone, have 18 to 35 percent clay in the subsoil, and have a frigid temperature regime	Carrollton		Frewsburg		
	SOILS ON OUTWASH PLAINS, TERRACES, AND ALLUVIAL FANS				
Very deep, moderately coarse textured soils that formed in gravelly material over stratified sand and gravel	Chenango	Pompton	Red Hook		Halsey
Very deep, moderately coarse textured soils that formed in glaciofluvial material	Valois				
Very deep, moderately coarse textured soils that formed in silty material and the underlying stratified sand and gravel	Allard				
	SOILS ON LACUSTRINE PLAINS AND SANDY DELTAS				
Very deep, fine textured soils that formed in glaciolacustrine deposits and that have more than 35 percent clay in the subsoil			Rhinebeck		
Very deep, fine textured soils that formed in glaciolacustrine deposits and the underlying glacial till at a depth of 20 to 40 inches and that have more than 35 percent clay in the subsoil			Churchville	Canandaigua	Canandaigua
Very deep, moderately fine textured soils that formed in glaciolacustrine deposits and that have 18 to 35 percent clay in the subsoil	Dunkirk	Collamer	Niagara		

TABLE 19.--RELATIONSHIP BETWEEN PARENT MATERIAL, LANDSCAPE POSITION, AND DRAINAGE CLASS OF THE SOILS--Continued

Soil characteristics and parent material	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON LACUSTRINE PLAINS AND SANDY DELTAS--Continued				
Very deep, moderately fine textured soils that formed in glaciolacustrine deposits and the underlying sand and gravel at a depth of 20 to 40 inches and that have 18 to 35 percent clay in the subsoil			Swormville	Getzville	
Very deep, medium textured soils that formed in glaciolacustrine silty deposits and that have less than 18 percent clay in the subsoil	Unadilla	Scio	Raynham		
Deep, moderately fine textured soils that formed in glaciolacustrine silty deposits over bedrock at a depth of 40 to 60 inches and that have 18 to 35 percent clay in the subsoil			Barcelona		
Very deep, moderately coarse textured soils that formed in sandy deposits and that have less than 18 percent clay	Colonie	Elnora	Minoa	Lamson	
Very deep, moderately coarse textured soils that formed in sandy deposits and the underlying silty material	Hinesburg				
	SOILS ON FLOOD PLAINS				
Very deep, medium textured soils that formed in neutral and mildly alkaline alluvial sediments	Hamlin	Teel	Wakeland	Wayland	Wayland
Very deep, medium textured soils that formed in slightly acid alluvial sediments	Tioga	Middlebury	Holton		
	SOILS IN SWAMPS AND BOGS				
Very deep soils that formed in material more than 51 inches thick					Carlisle
Very deep soils that formed in organic material 16 to 50 inches thick over loamy mineral soil					Palms
Very deep soils that formed in organic material less than 16 inches thick over sandy material					Henrietta

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alden	Fine-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Allard	Coarse-silty over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Aquents	Aquents
Ashville	Fine-loamy, mixed, nonacid, mesic Typic Haplaquepts
Barcelona	Fine-silty, mixed, mesic Aeric Ochraqualfs
Busti	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Canadice	Fine, illitic, mesic Typic Ochraqualfs
Canandaigua	Fine-silty, mixed, nonacid, mesic Mollic Haplaquepts
Canaseraga	Coarse-silty, mixed, mesic Typic Fragiochrepts
Carlisle	Euic, mesic Typic Medisaprists
Carrollton	Fine-loamy, mixed, frigid Typic Hapludults
Chadakoin	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Chautauqua	Coarse-loamy, mixed, mesic Aquic Dystrochrepts
Chenango	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Churchville	Fine, illitic, mesic Aeric Ochraqualfs
Collamer	Fine-silty, mixed, mesic Glossaquic Hapludalfs
Colonie	Mixed, mesic Alfic Udipsamments
Dalton	Coarse-silty, mixed, mesic Aeric Fragiaquepts
Darien	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Dunkirk	Fine-silty, mixed, mesic Glossoboric Hapludalfs
Elnora	Mixed, mesic Aquic Udipsamments
Erie	Fine-loamy, mixed, mesic Aeric Fragiaquepts
Fluvaquents	Fluvaquents
Fremont	Fine-loamy, mixed, acid, mesic Aeric Haplaquepts
Frewsburg	Fine-loamy, mixed, frigid Aeric Ochraquults
Getzville	Fine-silty over sandy or sandy-skeletal, mixed, nonacid, mesic Aeric Haplaquepts
Halsey	Coarse-loamy over sandy or sandy-skeletal, mixed, nonacid, mesic Mollic Haplaquepts
Hamlin	Coarse-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Henrietta	Coarse-loamy, mixed, nonacid, mesic Histic Humaquepts
Hinesburg	Sandy over loamy, mixed, nonacid, mesic Typic Udorthents
Holderton	Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Hornell	Fine, illitic, acid, mesic Aeric Haplaquepts
Ivory	Fine, mixed, frigid Aeric Ochraquults
Kinzua	Fine-loamy, mixed, frigid Typic Hapludults
Lamson	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Langford	Fine-loamy, mixed, mesic Typic Fragiochrepts
Manlius	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Mardin	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Middlebury	Coarse-loamy, mixed, mesic Fluvaquentic Eutrochrepts
Minoa	Coarse-loamy, mixed, mesic Aquic Dystric Eutrochrepts
Niagara	Fine-silty, mixed, mesic Aeric Ochraqualfs
Onoville	Fine-loamy, mixed, frigid Aquic Fragiudults
Orpark	Fine-loamy, mixed, acid, mesic Aeric Haplaquepts
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Pompton	Coarse-loamy, mixed, mesic Aquic Dystrochrepts
Raynham	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Red Hook	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Rhinebeck	Fine, illitic, mesic Aeric Ochraqualfs
Saprists	Saprists
Schuyler	Fine-loamy, mixed, mesic Aquic Dystrochrepts
Scio	Coarse-silty, mixed, mesic Aquic Dystrochrepts
Swormville	Fine-silty over sandy or sandy-skeletal, mixed, mesic Aeric Ochraqualfs
Teel	Coarse-silty, mixed, mesic Fluvaquentic Eutrochrepts
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Towerville	Fine-loamy, mixed, mesic Aquic Dystrochrepts
Udifluvents	Udifluvents
Udorthents	Udorthents
Unadilla	Coarse-silty, mixed, mesic Typic Dystrochrepts
Valois	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Volusia	Fine-loamy, mixed, mesic Aeric Fragiaquepts
Wakeville	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Wayland	Fine-silty, mixed, nonacid, mesic Mollic Fluvaquents

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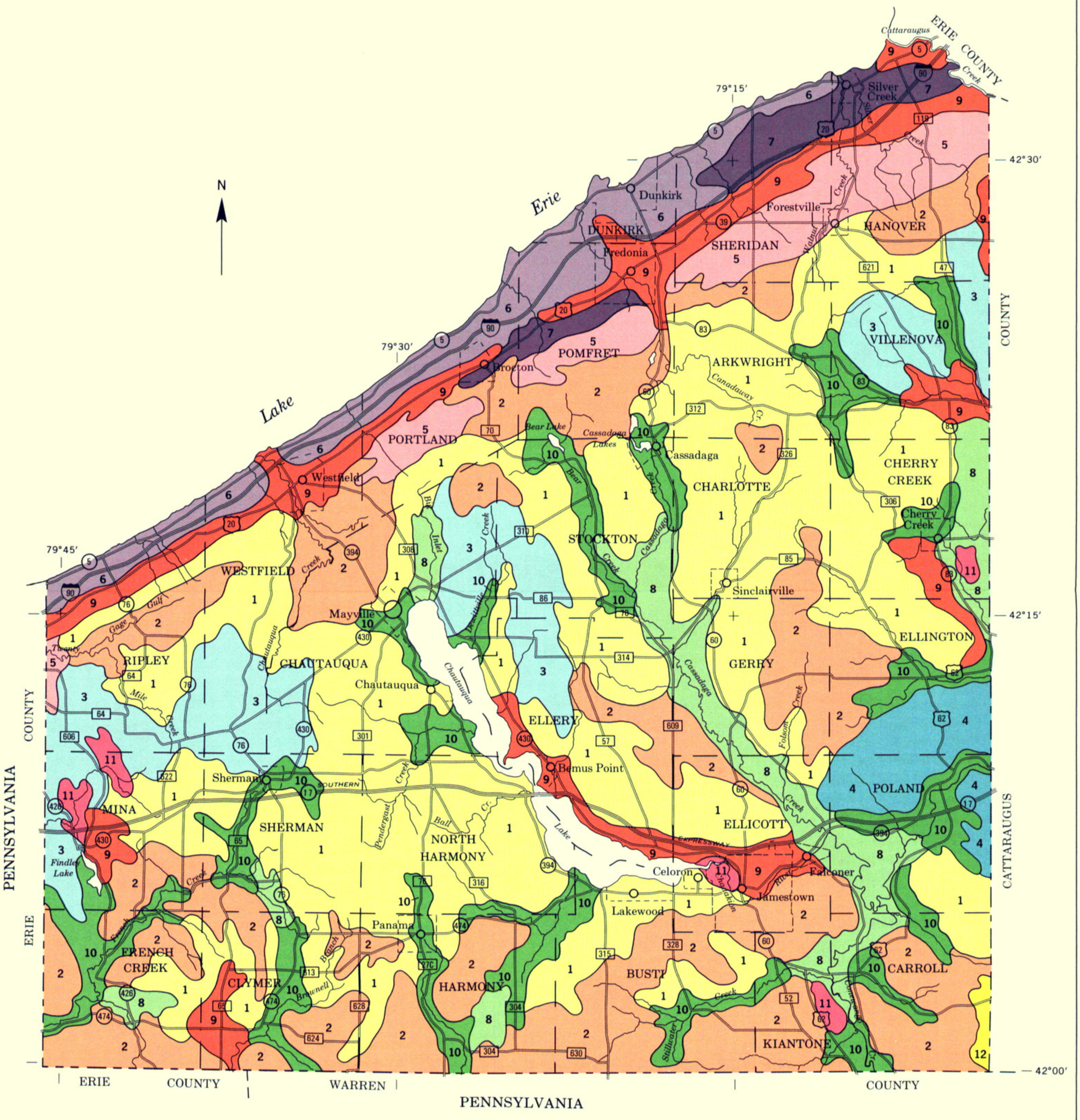
NRCS Accessibility Statement



SOIL LEGEND*

AREAS DOMINATED BY VERY DEEP SOILS THAT DO NOT HAVE A FRAGIPAN AND THAT FORMED IN GLACIAL TILL

- 1 Busti-Chautauqua-Chadakoin
- 2 Fremont-Schuyler

AREAS DOMINATED BY VERY DEEP SOILS THAT HAVE A FRAGIPAN AND THAT FORMED IN GLACIAL TILL

- 3 Erie-Langford
- 4 Volusia-Mardin

AREAS DOMINATED BY MODERATELY DEEP SOILS FORMED IN GLACIAL TILL

- 5 Hornell-Orpark

AREAS DOMINATED BY DEEP AND VERY DEEP SOILS FORMED IN GLACIAL LAKE SEDIMENTS

- 6 Niagara-Canandaigua-Minoa
- 7 Barcelona-Rhinebeck
- 8 Raynham-Canandaigua-Getzville

AREAS DOMINATED BY VERY DEEP SOILS FORMED IN GLACIAL TILL AND GLACIAL OUTWASH

- 9 Valois-Chenango-Pompton

AREAS DOMINATED BY VERY DEEP SOILS FORMED IN GLACIAL OUTWASH, GLACIOLACUSTRINE MATERIAL, AND RECENT ALLUVIUM

- 10 Chenango-Wayland-Swormville

AREAS DOMINATED BY VERY DEEP SOILS FORMED IN ORGANIC DEPOSITS

- 11 Palms-Carlisle

AREAS DOMINATED BY MODERATELY DEEP SOILS THAT FORMED IN RESIDUAL MATERIAL

- 12 Frewsburg-Carrollton

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1993

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

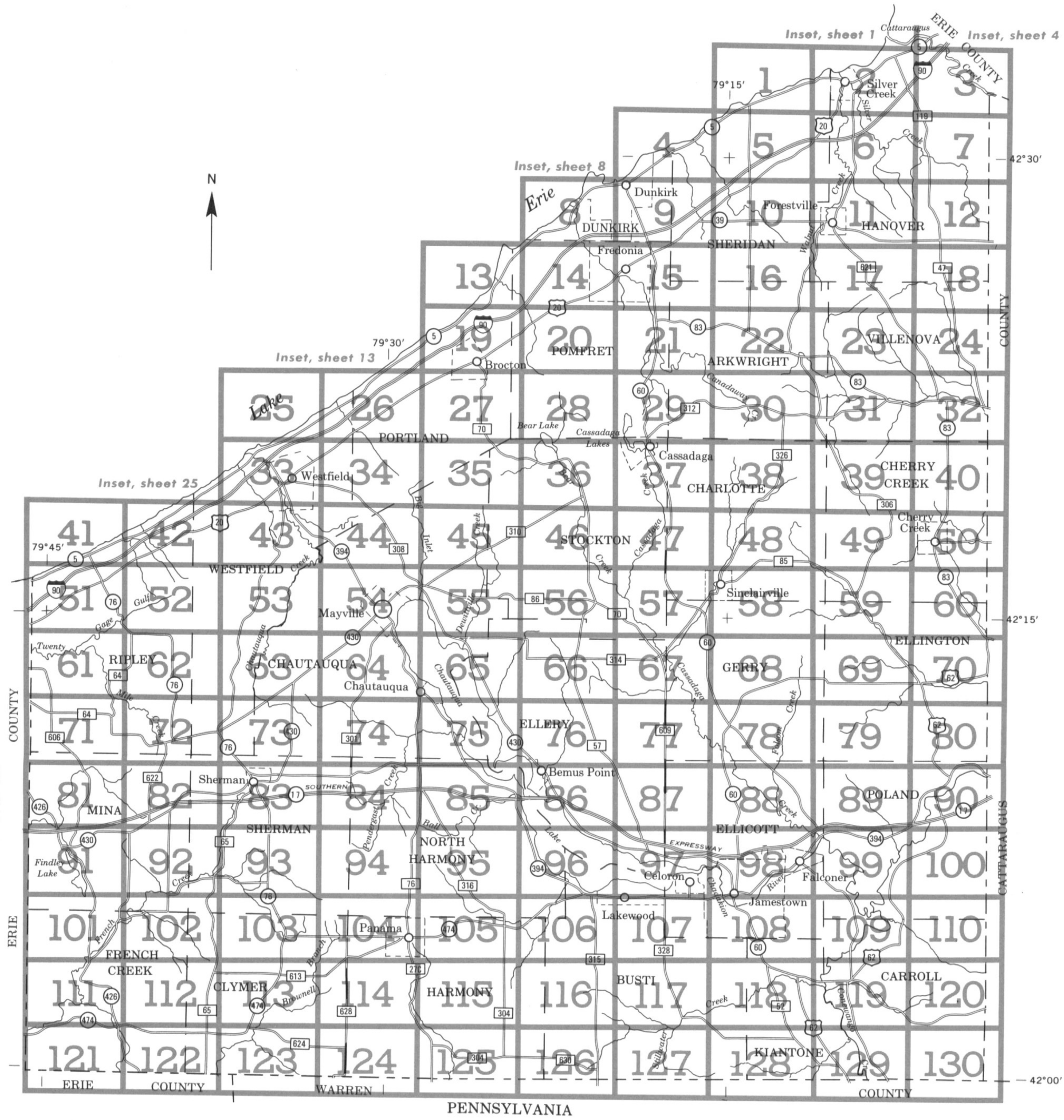
CHAUTAUQUA COUNTY, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



Original text from each individual map sheet read:
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS
CHAUTAUQUA COUNTY, NEW YORK

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of a combination of letters. The first two letters of the symbol represent the soil. The capital letter following these letters is the slope class. Symbols without a slope letter are for nearly level soils, miscellaneous areas, and soils named at categories above the series level.

SYMBOL	NAME
Ad	Aiden mucky silt loam
AlA	Allard silt loam, 0 to 3 percent slopes
AlB	Allard silt loam, 3 to 8 percent slopes
As	Ashville silt loam
BrA	Barcelona silt loam, 0 to 3 percent slopes
BrB	Barcelona silt loam, 3 to 8 percent slopes
BsA	Busti silt loam, 0 to 3 percent slopes
BsB	Busti silt loam, 3 to 8 percent slopes
BsC	Busti silt loam, 8 to 15 percent slopes
Ca	Canadice silty clay loam
Cb	Canandaigua silt loam, loamy substratum
Cc	Canandaigua mucky silt loam
CdB	Canaseraga silt loam, 3 to 8 percent slopes
CdC	Canaseraga silt loam, 8 to 15 percent slopes
Ce	Carlisle muck
CfC	Carrollton channery silt loam, 8 to 15 percent slopes
CfD	Carrollton channery silt loam, 15 to 25 percent slopes
ChB	Chadakoin silt loam, 3 to 8 percent slopes
ChC	Chadakoin silt loam, 8 to 15 percent slopes
ChD	Chadakoin silt loam, 15 to 25 percent slopes
ChE	Chadakoin silt loam, 25 to 35 percent slopes
ChF	Chadakoin silt loam, 35 to 50 percent slopes
CkB	Chautauqua silt loam, 3 to 8 percent slopes
CkC	Chautauqua silt loam, 8 to 15 percent slopes
CkD	Chautauqua silt loam, 15 to 25 percent slopes
ClA	Chenango silt loam, 0 to 3 percent slopes
ClB	Chenango silt loam, 3 to 8 percent slopes
CnA	Chenango gravelly loam, 0 to 3 percent slopes
CnB	Chenango gravelly loam, 3 to 8 percent slopes
CnC	Chenango gravelly loam, 8 to 15 percent slopes
CnD	Chenango gravelly loam, 15 to 25 percent slopes
CnE	Chenango gravelly loam, 25 to 40 percent slopes
CoA	Chenango channery loam, fan, 0 to 3 percent slopes
CoB	Chenango channery loam, fan, 3 to 8 percent slopes
CpA	Churchville silt loam, 0 to 3 percent slopes
CpB	Churchville silt loam, 3 to 8 percent slopes
CpC	Churchville silt loam, 8 to 15 percent slopes
CsB	Collamer silt loam, 3 to 8 percent slopes
CsC	Collamer silt loam, 8 to 15 percent slopes
CvB	Colonie loamy fine sand, 3 to 8 percent slopes
CvC	Colonie loamy fine sand, 8 to 15 percent slopes
DaA	Dalton silt loam, 0 to 3 percent slopes
DaB	Dalton silt loam, 3 to 8 percent slopes
DeA	Darien silt loam, 0 to 3 percent slopes
DeB	Darien silt loam, 3 to 8 percent slopes
DeC	Darien silt loam, 8 to 15 percent slopes
DkD	Dunkirk silt loam, 15 to 25 percent slopes
DkE	Dunkirk silt loam, 25 to 45 percent slopes
ElA	Elnora fine sandy loam, 0 to 3 percent slopes
ElB	Elnora fine sandy loam, 3 to 8 percent slopes
ErA	Erie silt loam, 0 to 3 percent slopes
ErB	Erie silt loam, 3 to 8 percent slopes
ErC	Erie silt loam, 8 to 15 percent slopes
Fe	Fluvaquents-Udifluvents complex, frequently flooded
FmA	Fremont silt loam, 0 to 3 percent slopes
FmB	Fremont silt loam, 3 to 8 percent slopes
FmC	Fremont silt loam, 8 to 15 percent slopes
FmD	Fremont silt loam, 15 to 25 percent slopes
FrB	Frewsburg silt loam, 3 to 8 percent slopes
FrC	Frewsburg silt loam, 8 to 15 percent slopes
Ge	Getzville silt loam
Ha	Halsey mucky silt loam
He	Hamlin silt loam
Hm	Henrietta muck
HnA	Hinesburg fine sandy loam, 0 to 3 percent slopes
HnB	Hinesburg fine sandy loam, 3 to 8 percent slopes
HnC	Hinesburg fine sandy loam, 8 to 15 percent slopes
Ho	Holderton silt loam
HrA	Hornell silt loam, 0 to 3 percent slopes
HrB	Hornell silt loam, 3 to 8 percent slopes
HrC	Hornell silt loam, 8 to 15 percent slopes
HrD	Hornell silt loam, 15 to 25 percent slopes
IvB	Ivory silty clay loam, 3 to 8 percent slopes
KnE	Kinzua channery silt loam, 25 to 45 percent slopes
La	Lamson silt loam
LnB	Langford silt loam, 3 to 8 percent slopes
LnC	Langford silt loam, 8 to 15 percent slopes
MdB	Mardin channery silt loam, 3 to 8 percent slopes
MdC	Mardin channery silt loam, 8 to 15 percent slopes
MdD	Mardin channery silt loam, 15 to 25 percent slopes
Me	Middlebury silt loam
Mn	Minoa fine sandy loam
NgA	Niagara silt loam, 0 to 3 percent slopes, loamy substratum
NgB	Niagara silt loam, 3 to 8 percent slopes, loamy substratum
OnD	Onoville silt loam, 10 to 25 percent slopes
OrA	Orpark silt loam, 0 to 3 percent slopes
OrB	Orpark silt loam, 3 to 8 percent slopes
OrC	Orpark silt loam, 8 to 15 percent slopes
OrD	Orpark silt loam, 15 to 25 percent slopes
Pa	Palms muck
Pg	Pits, gravel
Po	Pompton silt loam
RaA	Raynham silt loam, 0 to 3 percent slopes
RaB	Raynham silt loam, 3 to 8 percent slopes
Rf	Raynham silt loam, flooded
Rh	Red Hook silt loam
RnA	Rhinebeck silt loam, 0 to 3 percent slopes
RoF	Rock outcrop-Manlius complex, 35 to 70 percent slopes
Sa	Saprists and Aquents, ponded
ShB	Schuyler silt loam, 3 to 8 percent slopes
ShC	Schuyler silt loam, 8 to 15 percent slopes
ShD	Schuyler silt loam, 15 to 25 percent slopes
ShE	Schuyler silt loam, 25 to 35 percent slopes
ShF	Schuyler silt loam, 35 to 50 percent slopes
SoA	Scio silt loam, 0 to 3 percent slopes
SoB	Scio silt loam, 3 to 8 percent slopes
Sw	Swormville silt loam
Te	Teel silt loam
Tg	Tioga silt loam
ToB	Towerville silt loam, 3 to 8 percent slopes
ToC	Towerville silt loam, 8 to 15 percent slopes
ToD	Towerville silt loam, 15 to 25 percent slopes
ToE	Towerville silt loam, 25 to 35 percent slopes
ToF	Towerville silt loam, 35 to 50 percent slopes
Ud	Udorthents, landfill
Ue	Udorthents, loamy-skeletal
UnA	Unadilla silt loam, 0 to 3 percent slopes
UnB	Unadilla silt loam, 3 to 8 percent slopes
UnC	Unadilla silt loam, 8 to 15 percent slopes
Ur	Urban land
VaB	Valois gravelly silt loam, 3 to 8 percent slopes
VaC	Valois gravelly silt loam, 8 to 15 percent slopes
VaD	Valois gravelly silt loam, 15 to 25 percent slopes
VaE	Valois gravelly silt loam, 25 to 35 percent slopes
VaF	Valois gravelly silt loam, 35 to 50 percent slopes
VcC	Valois gravelly silt loam, rolling
VoA	Volusia channery silt loam, 0 to 3 percent slopes
VoB	Volusia channery silt loam, 3 to 8 percent slopes
VoC	Volusia channery silt loam, 8 to 15 percent slopes
W	Water
Wa	Wakeville silt loam
Wy	Wayland silt loam

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Davis Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban area)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — Ad BrB

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

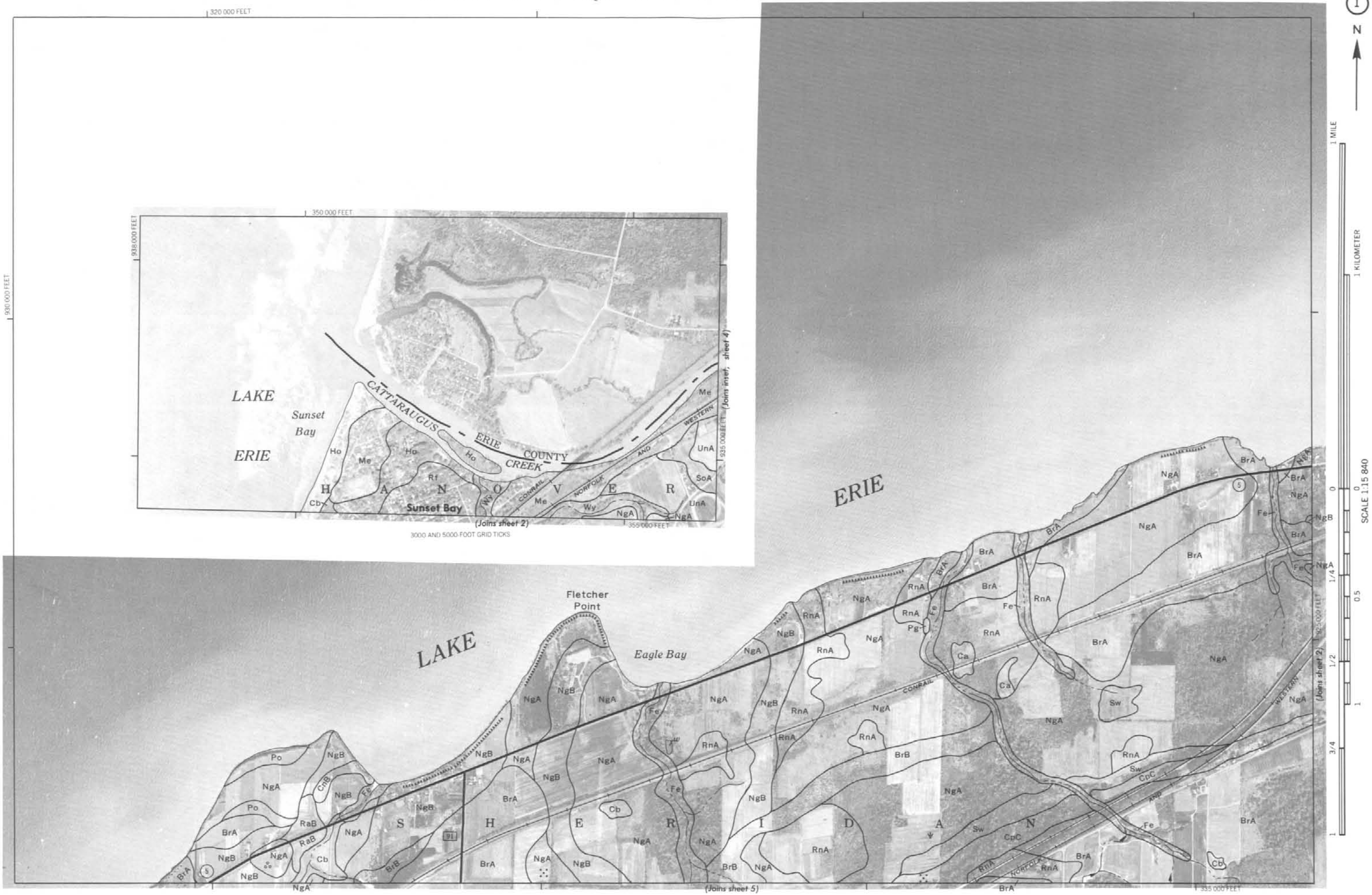
GULLY

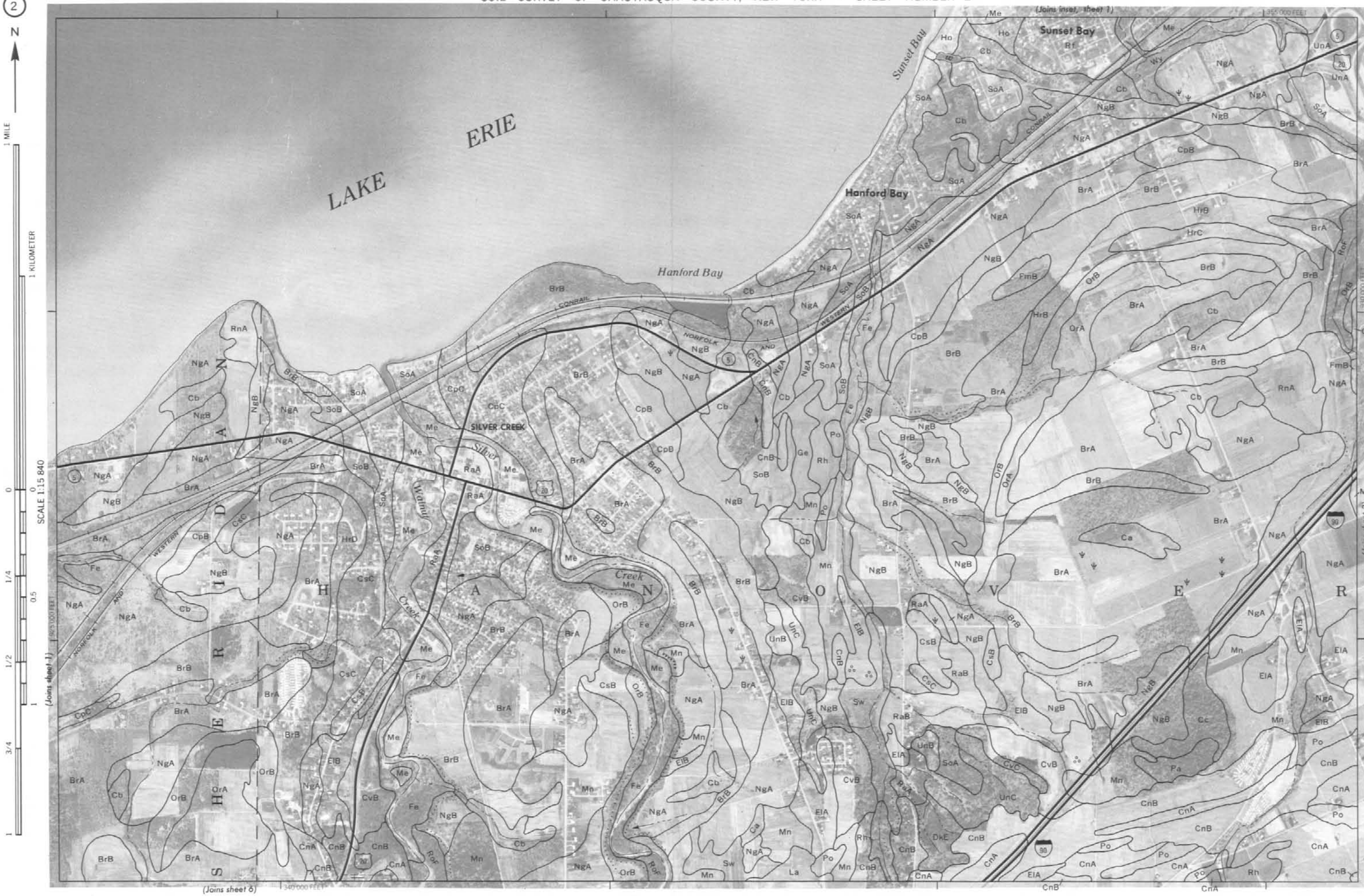
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

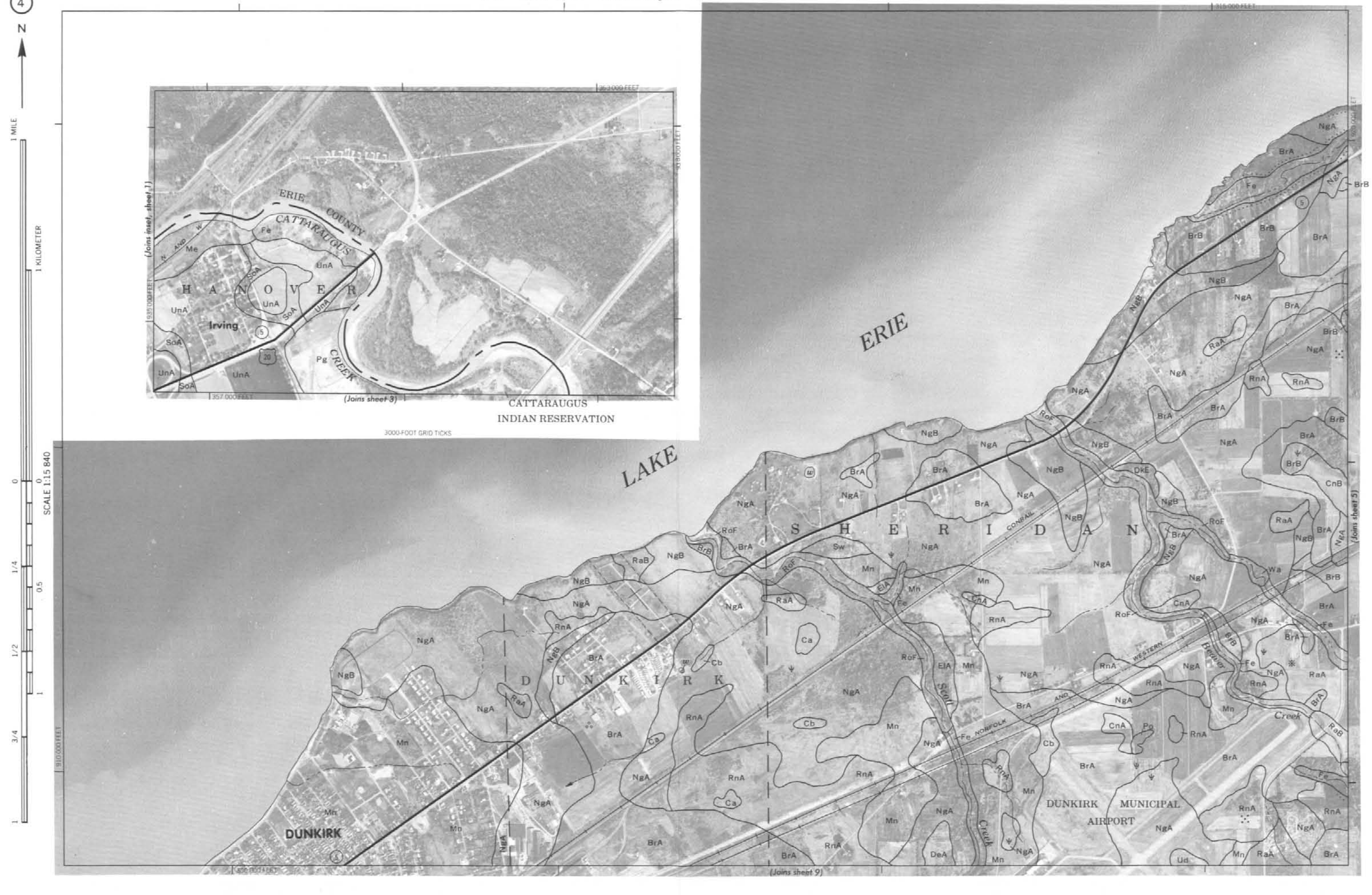
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Windswept (less than 15 acres)


1
N
LAKE ERIE
Sunset Bay
CATTARAUGUS CREEK
ERIE COUNTY
HANOVER
Sunset Bay
CONRAIL
NORFOLK AND WESTERN
(Joins sheet 2)
(Joins inset, sheet 4)
3000 AND 5000-FOOT GRID TICKS
320 000 FEET
930 000 FEET
350 000 FEET
938 000 FEET
935 000 FEET
355 000 FEET
Fletcher Point
Eagle Bay
SHERIDAN
(Joins sheet 5)
(Joins sheet 2)
335 000 FEET
925 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840


2
N
1 MILE
1 KILOMETER
SCALE 1:15 840
LAKE ERIE
Hanford Bay
Sunset Bay
SILVER CREEK
Silver Creek
Walnut Creek
CONRAIL
NORFOLK AND WESTERN
(Joins inset, sheet 1)
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 6)
355 000 FEET
340 000 FEET
HANOVER
SHERIDAN


3
N
(Joins inset, sheet 4)
360 000 FEET
ERIE CO
(Joins sheet 2)
930 000 FEET
(Joins sheet 7)
925 000 FEET
375 000 FEET
CATTARAUGUS
INDIAN
RESERVATION
ERIE
COUNTY
CATTARAUGUS
COUNTY
H A N O V E R
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
UnA
SoA
Pg
He
Fe
BrB
BrA
OrC
HrB
RoF
OrB
OrA
AlA
FmB
NgA
RaB
Mn
Cb
RaA
RnA
ElA
NgB
La
Ca
Rh
ElB
CnB
Po
Ge
CnA
BrB
ToE
RnA

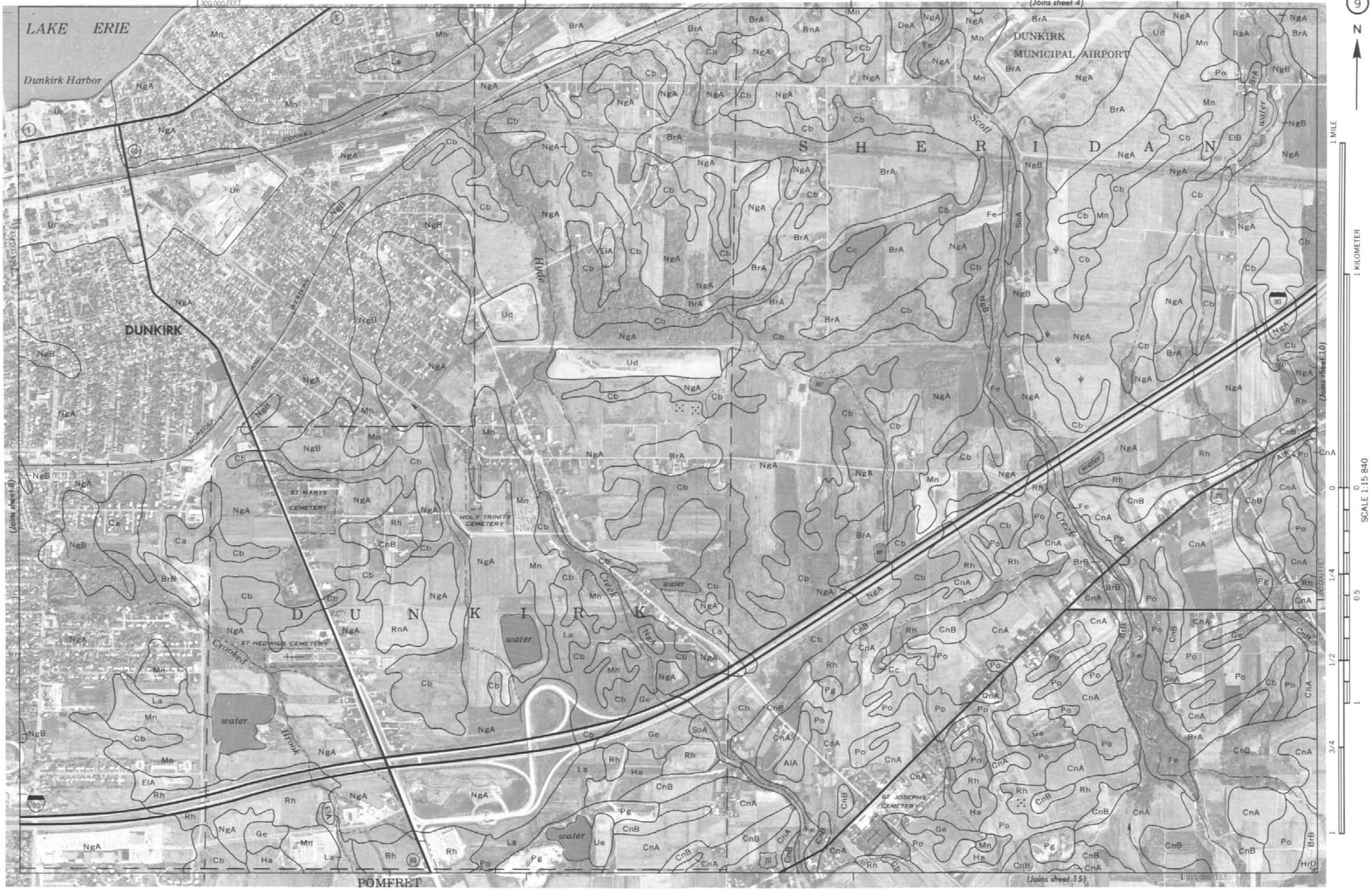

4
N
1 MILE
1 KILOMETER
SCALE 1:15 840
ERIE COUNTY
CATTARAUGUS
HANOVER
Irving
CATTARAUGUS CREEK
(Joins inset, sheet 1)
(Joins sheet 3)
CATTARAUGUS INDIAN RESERVATION
3000-FOOT GRID TICKS
LAKE ERIE
SHERIDAN
DUNKIRK
DUNKIRK MUNICIPAL AIRPORT
Scott Creek
Beaver Creek
CONRAIL
NORFOLK AND WESTERN
(Joins sheet 5)
(Joins sheet 9)

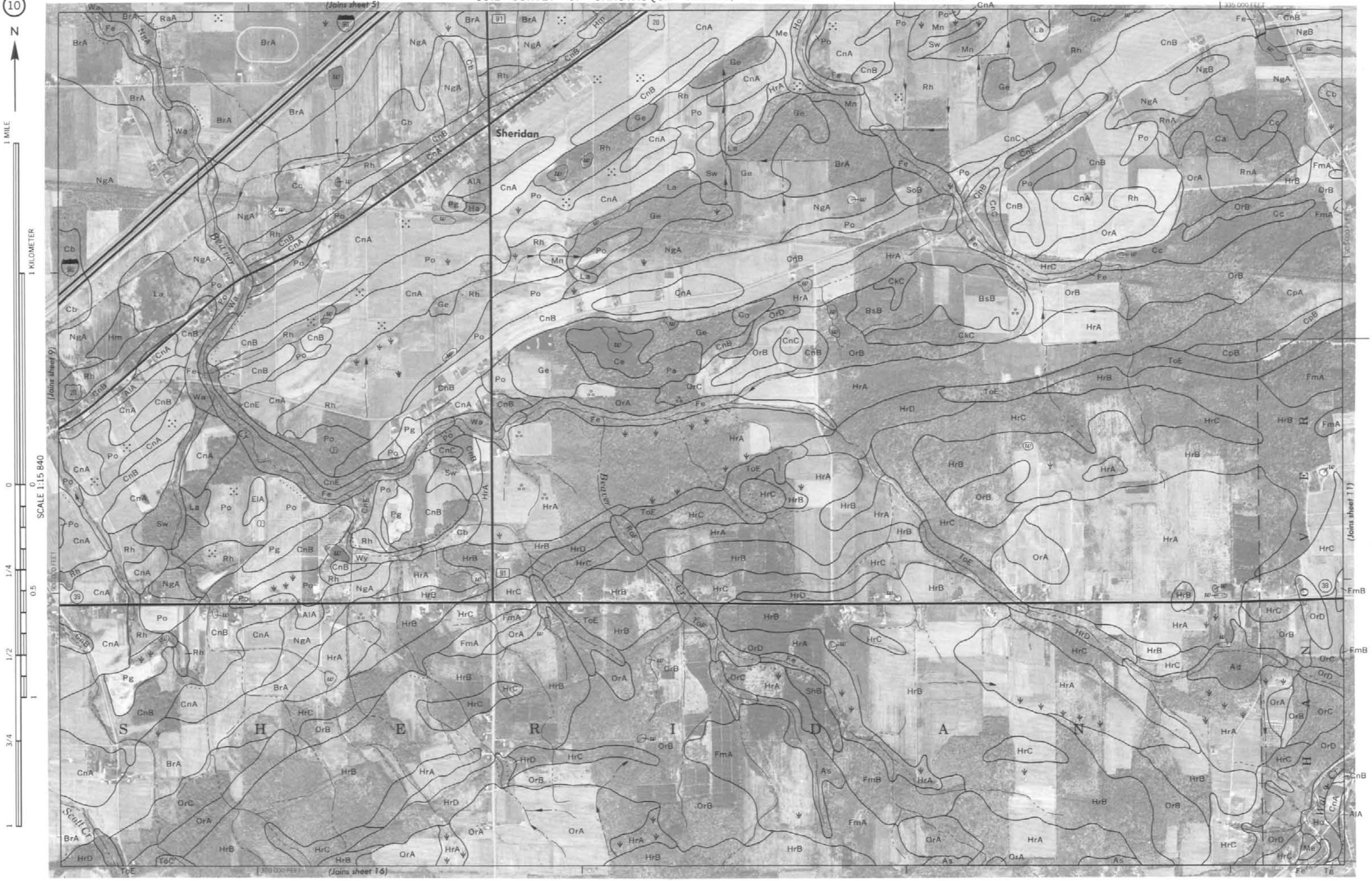

5
N
(Joins sheet 1)
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 10)
320 000 FEET
335 000 FEET
910 000 FEET
920 000 FEET
LAKE ERIE
S H E R I D A N
CONRAIL
NORFOLK AND WESTERN
Beaver
Hawkins Corners
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


6
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 2)
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 11)
340 000 FEET
910 000 FEET
Hanover Center
Dennison Corners
Keaches Corners
Walnut Creek
Silver Creek
H A N O V E R
H A N O V E R
20
90


7
N
(Joins sheet 3)
360 000 FEET
CATTARAUGUS INDIAN RESERVATION
H A N O V E R
CATTARAUGUS COUNTY
(Joins sheet 6)
Silver Cr
Smith Mills
Silver Creek Res
Silver Creek
Balltown
(Joins sheet 12)
910 000 FEET
375 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


8
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins inset)
295 000 FEET
LAKE ERIE
Dunkirk Harbor
water
LAKE
ERIE
Point Gratiot
(Joins upper right)
291 000 FEET
1000 AND 4000-FOOT GRID TICKS
LAKE
ERIE
Crooked Brook
DUNKIRK
CONRAIL
NORFOLK AND WESTERN
Canadaway
D U N K I R K
Beaver Cr
Creek
POMFRET
(Joins sheet 14)
(Joins sheet 9)
900 000 FEET
280 000 FEET

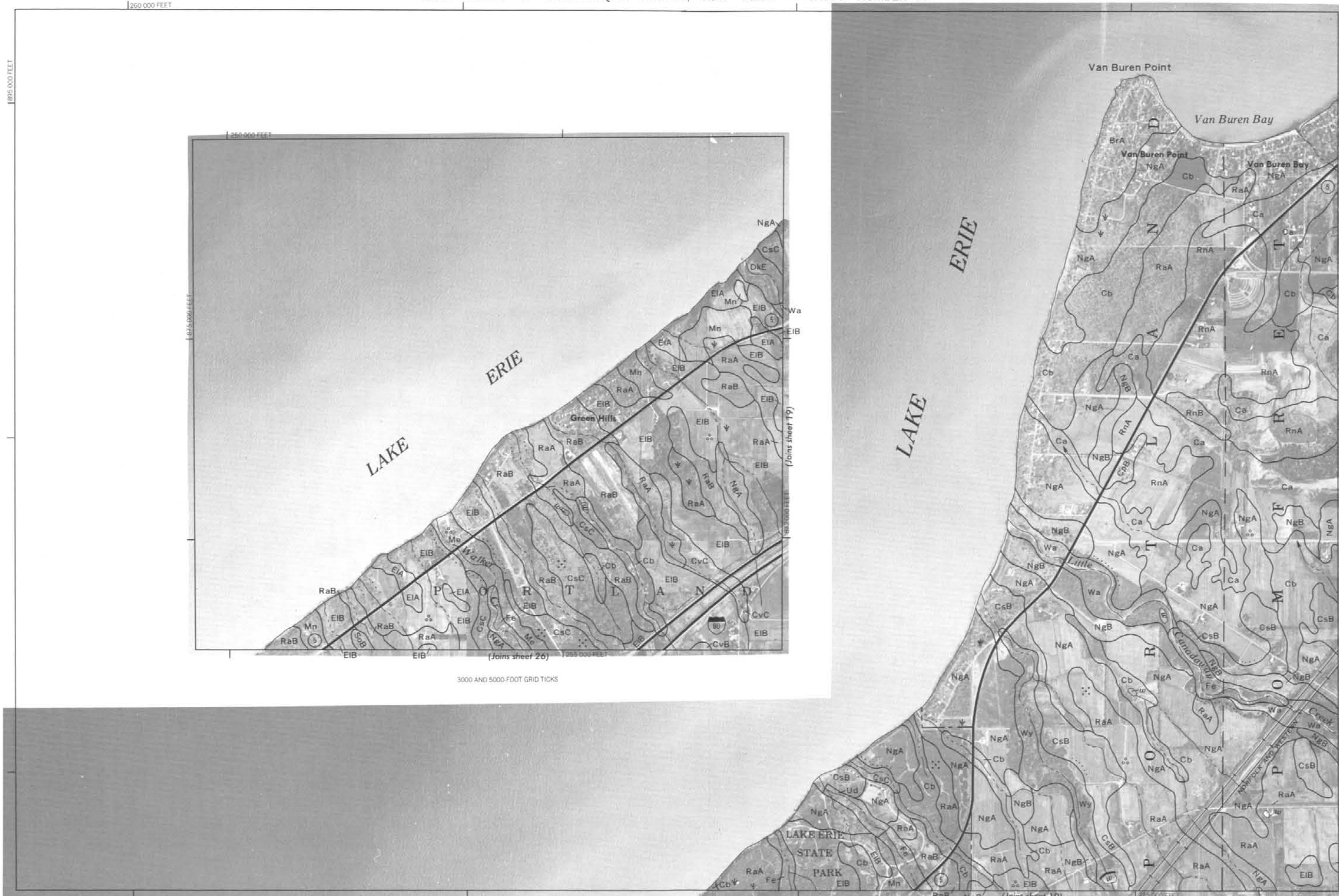

9
N
(Joins sheet 4)
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
300 000 FEET
315 000 FEET
LAKE ERIE
Dunkirk Harbor
DUNKIRK
D U N K I R K
S H E R I D A N
POMFRET
DUNKIRK MUNICIPAL AIRPORT
CONRAIL
NORFOLK AND WESTERN
ST MARYS CEMETERY
HOLY TRINITY CEMETERY
ST HEDWIGS CEMETERY
ST JOSEPHS CEMETERY
Crooked Brook
Hyde Creek
Scott Creek
water
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


10
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 5)
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
335 000 FEET
370 000 FEET
Sheridan
S H E R I D A N
H A N O V E R
Beaver Cr.
Scott Cr.
Walnut Cr.


11
N
(Joins sheet 6)
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
340 000 FEET
355 000 FEET
905 000 FEET
900 000 FEET
Keaches Corners
Forestville
Walnut Creek
Walnut
Creek
Tupper
Creek
S H E R I D A N
H A N O V E R
39
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


12
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 7)
(Joins sheet 11)
(Joins sheet 18)
HANOVER
CATTARAUGUS COUNTY
Balltown
Wheeler Brook
Silver Creek
Silver Creek Reservoir
Parcells Corners
Nashville

(13)


260 000 FEET
895 000 FEET
250 000 FEET
875 000 FEET
LAKE
ERIE
Green Hills
Walker
PORTLAND
(Joins sheet 19)
(Joins sheet 26)
255 000 FEET
3000 AND 5000-FOOT GRID TICKS
Van Buren Point
Van Buren Bay
LAKE
ERIE
Little
Canadaway
Creek
NORFOLK AND WESTERN
LAKE ERIE
STATE
PARK
PORTLAND
POMFRET
(Joins sheet 14)
(Joins sheet 19)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 8)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 20)
LAKE ERIE
Van Buren Bay
D U N K I R K
P O M F R E T
FREDONIA
Canadaway
Creek
Beaver
Little Canadaway
CONRAIL AND WESTERN
NORFOLK
295 000 FEET
280 000 FEET


15
N
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 21)
D U N K I R K
S H E R I D A N
P O M F R E T
A R K W R I G H T
FREDONIA
Laona
ST ANTHONY CEMETERY
Canadaway Creek
Crooked Brook
Hyde Creek
300 000 FEET
815 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 10)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 22)
335 000 FEET
320 000 FEET
S H E R I D A N
A R K W R I G H T
Scott Creek
Walnut Creek
HANOVER


17
N
(Joins sheet 11)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 23)
HANOVER
VILLENOVA
ARKWRIGHT
Tupper Creek
Walnut
1 MILE
1 KILOMETER
SCALE 1:15 840
340 000 FEET
355 000 FEET


18
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 12)
(Joins sheet 17)
(Joins sheet 24)
375 000 FEET
895 000 FEET
885 000 FEET
1 360 000 FEET
Parcells Corners
Nashville
H A N O V E R
V I L L E N O V A
Silver Creek
Fe
East
Mud
Lake
North Branch
Conewango
Cr
CATTARAUGUS COUNTY
FmA
ShB
FmB
FmC
ElB
NgB
NgA
DeB
DeC
CpB
CkB
CkC
CkD
CsB
CsC
CnB
CnC
CnA
CnD
UnC
OrB
VcC
VaC
VaD
VaB
VaE
VaF
BsB
BsA
Ad
RaA
Sa
CdB
ChE
ChC
ChB
ChD
As
Pa
Ce
CoB
Po
Rh
Pg
Ue
ShD
ErC
ErB
ErA
HrD
DcA
CbE
Cb
Rg
BkC


19
N
(Joins sheet 13)
LAKE ERIE
LAKE ERIE STATE PARK
Slippery Rock
Corell
Creek
Creek
PORTLAND
Brocton
CONRAIL
NORFOLK AND WESTERN
(Joins sheet 20)
(Joins inset, sheet 13)
(Joins sheet 27)
260 000 FEET
880 000 FEET
875 000 FEET
275 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840

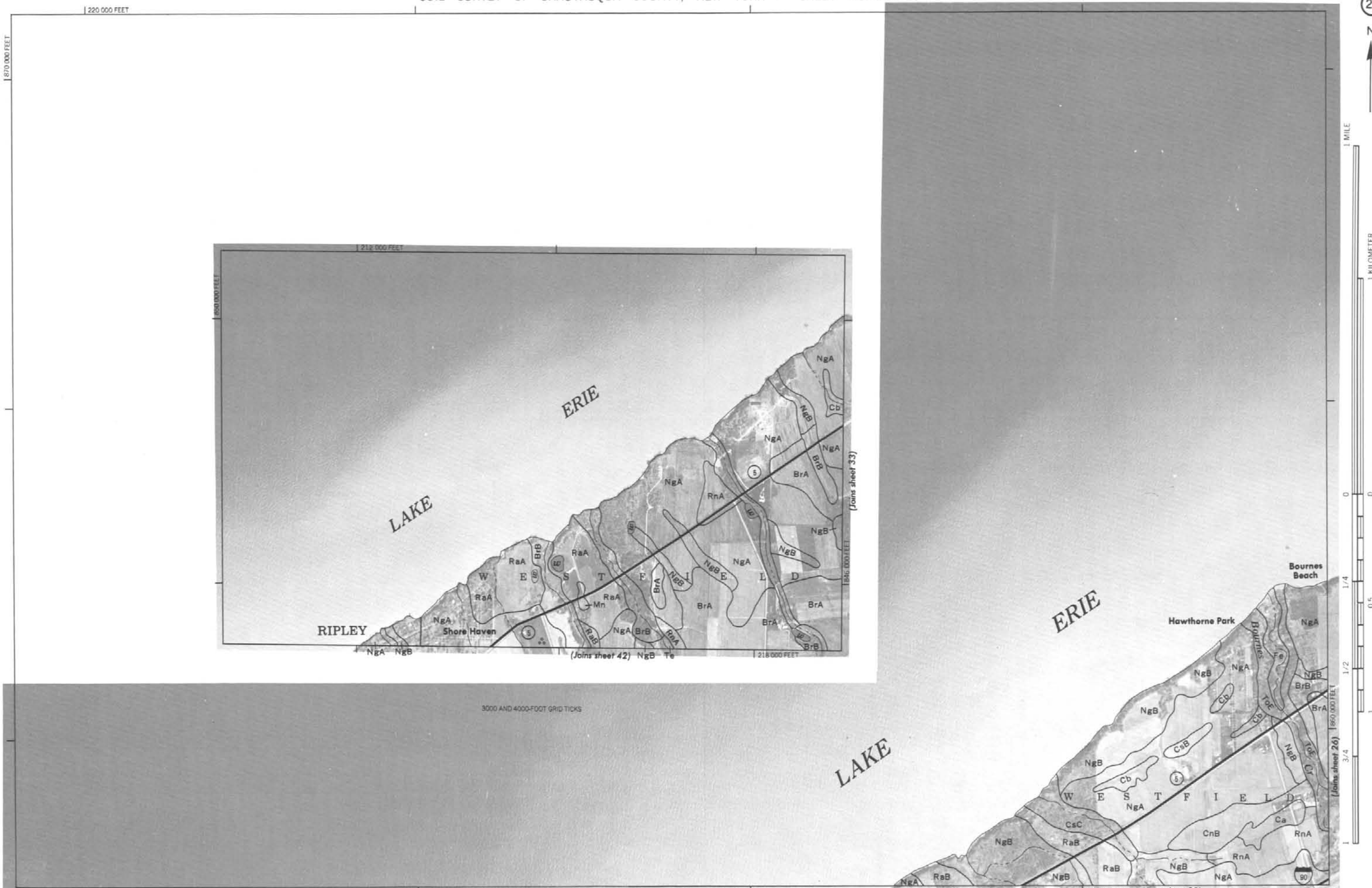

20
N
(Joins sheet 14)
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 28)
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
Lamberton
WEBSTER ROAD CEMETERY
Nortons Switch
Canadaway Creek
Little Canadaway Creek
Beaver Creek
Creek
P O M F R E T
Ud
90
20
610
280 000 FEET
295 000 FEET


21
N
(Joins sheet 15)
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 29)
1 MILE
1 KILOMETER
SCALE 1:15 840
Laona
Cowdens Corner
Shumla
DUTCH
HOLLOW
GULF
BALL
P O M F R E T
A R K W R I G H T
Canadaway
Canadaway Creek
Fredonia Reservoir
Shumla Falls
Arkwright Falls
Creek


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 16)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 30)
335 000 FEET
320 000 FEET
ARKWRIGHT
BALL GULF
Arkwright
Walnut Creek
Brook
Clinton
Chicken Tavern Corners
Black Corners
ARKWRIGHT SUMMIT CEMETERY
Black Pond


(Joins sheet 17)
23
N
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 31)
340 000 FEET
355 000 FEET
KIRKWOOD HARTWICK
VILLENOVA
BALL HILL CEMETERY
Pope Hill
Round Top Hill
West Mud Lake
W. Branch
Conewango
Black Pond
water
83
1 KILOMETER
1 MILE
SCALE 1:15 840

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 24


25
N
220 000 FEET
870 000 FEET
212 000 FEET
850 000 FEET
846 000 FEET
218 000 FEET
235 000 FEET
850 000 FEET
LAKE
ERIE
LAKE
ERIE
RIPLEY
Shore Haven
WESTFIELD
WESTFIELD
Hawthorne Park
Bournes Beach
Bournes Cr
(Joins sheet 33)
(Joins sheet 42)
(Joins sheet 33)
(Joins sheet 26)
NgA
NgB
Cb
BrB
BrA
RnA
RaA
Mn
RaB
Te
Fe
ToE
CsB
CsC
CnB
Ca
3000 AND 4000-FOOT GRID TICKS
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

(Joins inset, sheet 13)


27
N
(Joins sheet 19)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 35)
Brocton
Portland
Brocton Res
Burr Res
Corell Creek
Slippery Rock Cr
NORFOLK AND WESTERN
P O R T L A N D
P O M F R E T
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 20)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 36)
P O M F R E T
water
Bear Lake
295 000 FEET
280 000 FEET
860 000 FEET


29
N
(Joins sheet 21)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 37)
300 000 FEET
870 000 FEET
310 000 FEET
850 000 FEET
Shumla
Shumla Falls
Canadaway Creek
POMFRET
ARKWRIGHT
Upper Lake
CASSADAGA LAKES
Mud Lake
Lily Dale
CHRISTIAN CEMETERY
water
60
312
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


30
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 22)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 38)
A R K W R I G H T
Clinton Brook
Ackles Brook
Markham Brook
Canadaway Creek
Griswold
Dibble Hill
BURNHAM HOLLOW CEM
water
312
335 000 FEET
860 000 FEET
320 000 FEET


31
N
(Joins sheet 23)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 39)
840 000 FEET
870 000 FEET
Round Top Hill
Hamlet
Town Corners
Conewango
Creek
West
Branch
W R I G H T
K
R
A
V I L L E
N
O
V
A
83
312
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 32


33
N
(Joins sheet 25)
(Joins sheet 34)
(Joins sheet 43)
(Joins inset, sheet 25)
LAKE ERIE
Barcelona
Forest Park
WESTFIELD
W E S T F I E L D
ST JAMES CEMETERY
WESTERN
CONRAIL AND
NORFOLK
Chautauqua Cr
Spring Creek
Doty
Creek
Freelings
Vorce
Creek
Creek
220 000 FEET
865 000 FEET
845 000 FEET
235 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840


(Joins sheet 26)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 44)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
WESTFIELD
PORTLAND
CHAUTAUQUA
CONRAIL AND NORFOLK AND WESTERN
Bournes Creek
Spring Creek
Creek
water

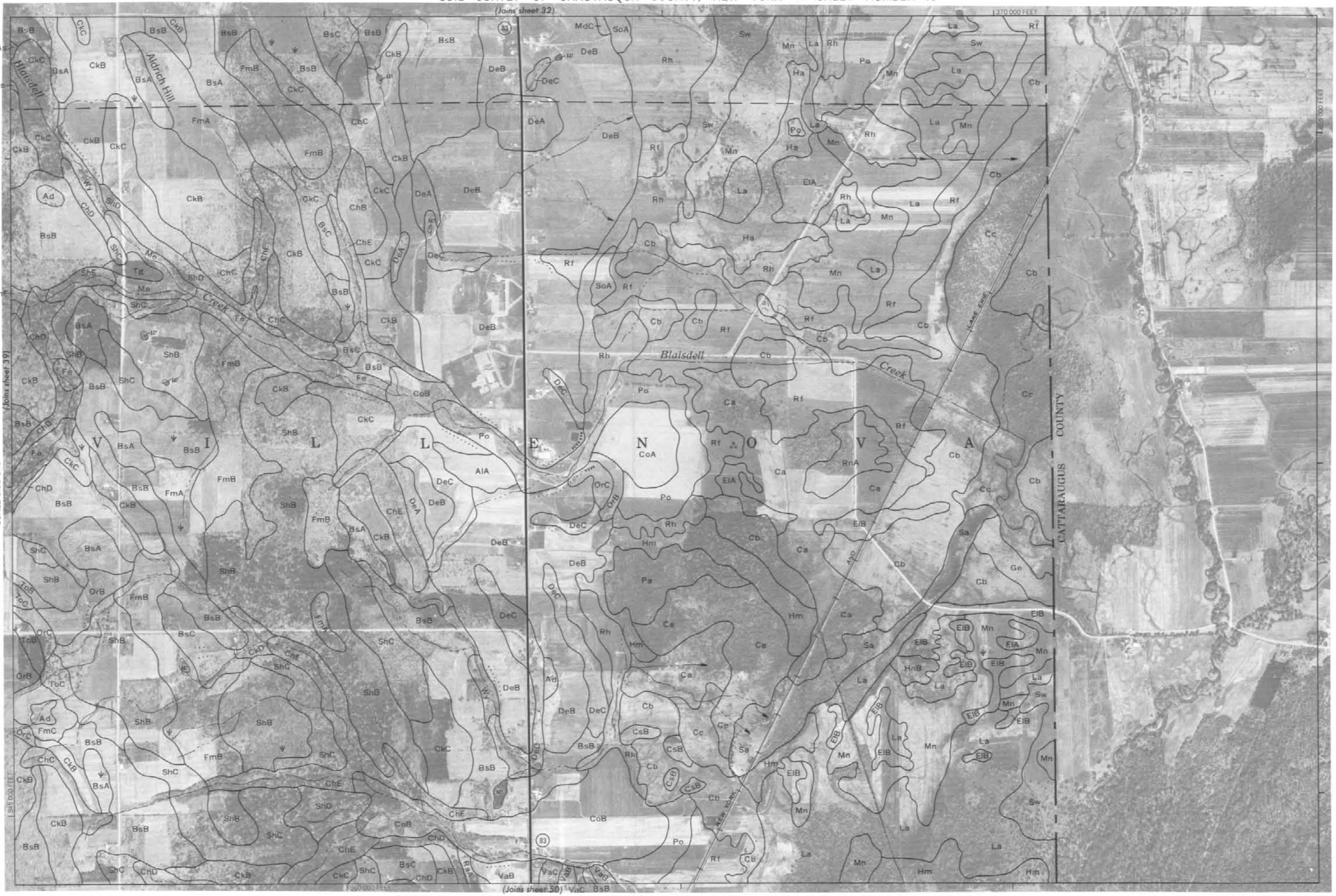

35
N
(Joins sheet 27)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 45)
260 000 FEET
275 000 FEET
855 000 FEET
845 000 FEET
POMFRET
P O R T L A N D
C H A U T A U Q U A
S T O C K T O N
Dean
70
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

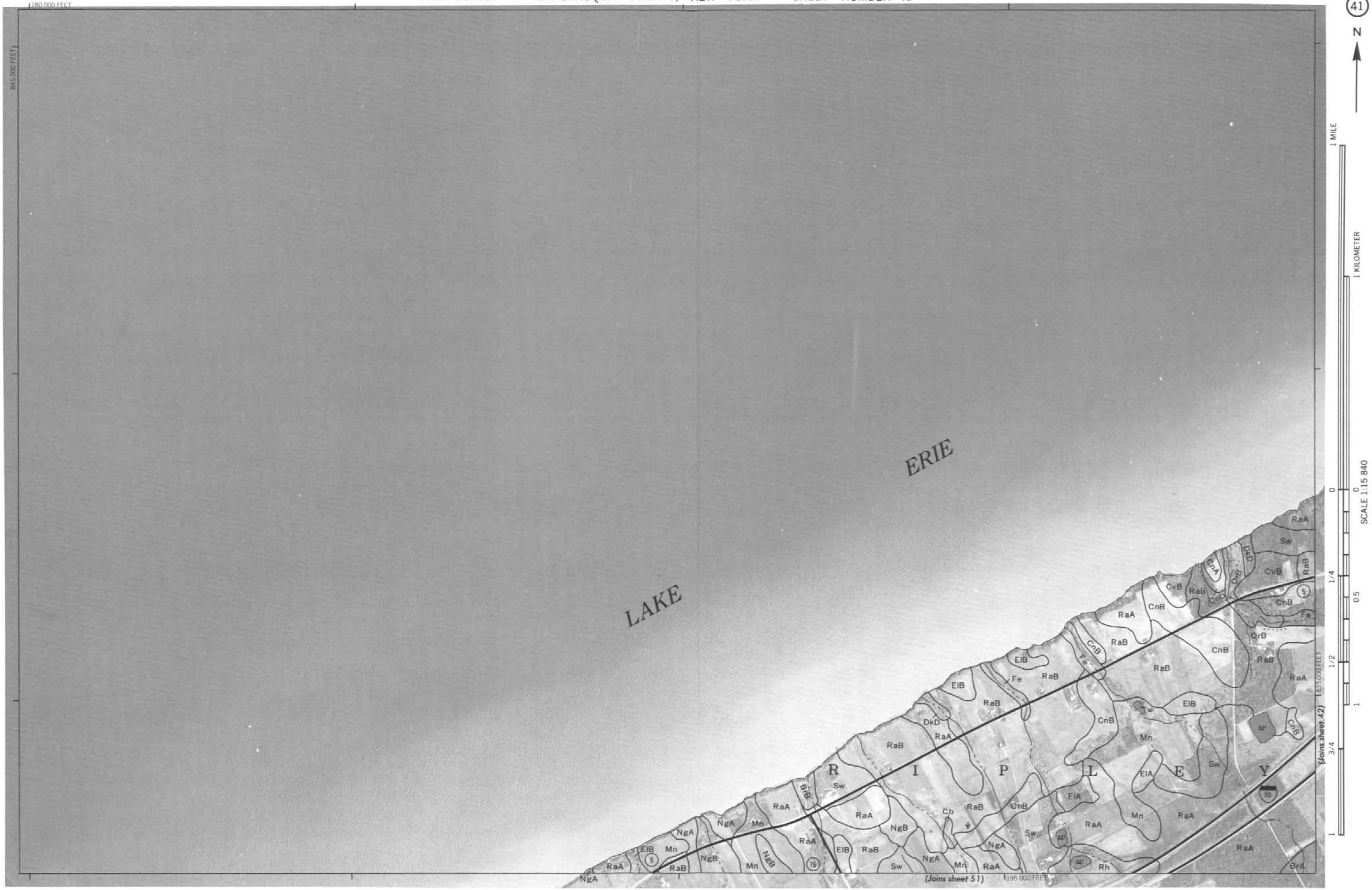

36
N
(Joins sheet 28)
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 46)
P O M F R E T
S T O C K T O N
Bear Lake
Kelly Corners
Bear Lake Outlet
Flag Creek
Stockton
STOCKTON CEMETERY
1 MILE
1 KILOMETER
SCALE 1:15 840
280 000 FEET
295 000 FEET
865 000 FEET


37
N
(Joins sheet 29)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 47)
Lily Dale
Middle Lake
CASSADAGA LAKES
Lower Lake
Cassadaga
CASSADAGA CEMETERY
Burnhams
Cassadaga Creek
Pickett Corners
Pickett Brook
POMFRET
ARKWRIGHT
STOCKTON
CHARLOTTE
1 MILE
1 KILOMETER
SCALE 1:15 840
1 300 000 FEET
1 325 000 FEET
855 000 FEET
830 000 FEET


(Joins sheet 30)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 48)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
ARKWRIGHT
CHARLOTTE
STATE
REFORESTATION
AREA
(CHAUTAUQUA NO. 7)
Luce Hill
Mill Creek
335 000 FEET
320 000 FEET
845 000 FEET


39
N
(Joins sheet 31)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 49)
340 000 FEET
365 000 FEET
V I L L E N O V A
C H E R R Y C R E E K
C H A R L O T T E
ARKWRIGHT
AREA
STATE
REFORESTATION
CHAUTAUQUA NO. 2
Blaisdell Creek
South Hill
Cherry Creek
Creek
water
1 MILE
1 KILOMETER
SCALE 1:15 840


N
(Joins sheet 32)
(Joins sheet 39)
(Joins sheet 50)
370 000 FEET
845 000 FEET
360 000 FEET
Blaisdell
Aldrich Hill
Creek
Blaisdell Creek
V I L L E N O V A
CATTARAUGUS COUNTY
LAKE ERIE AND NEW YORK
83
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

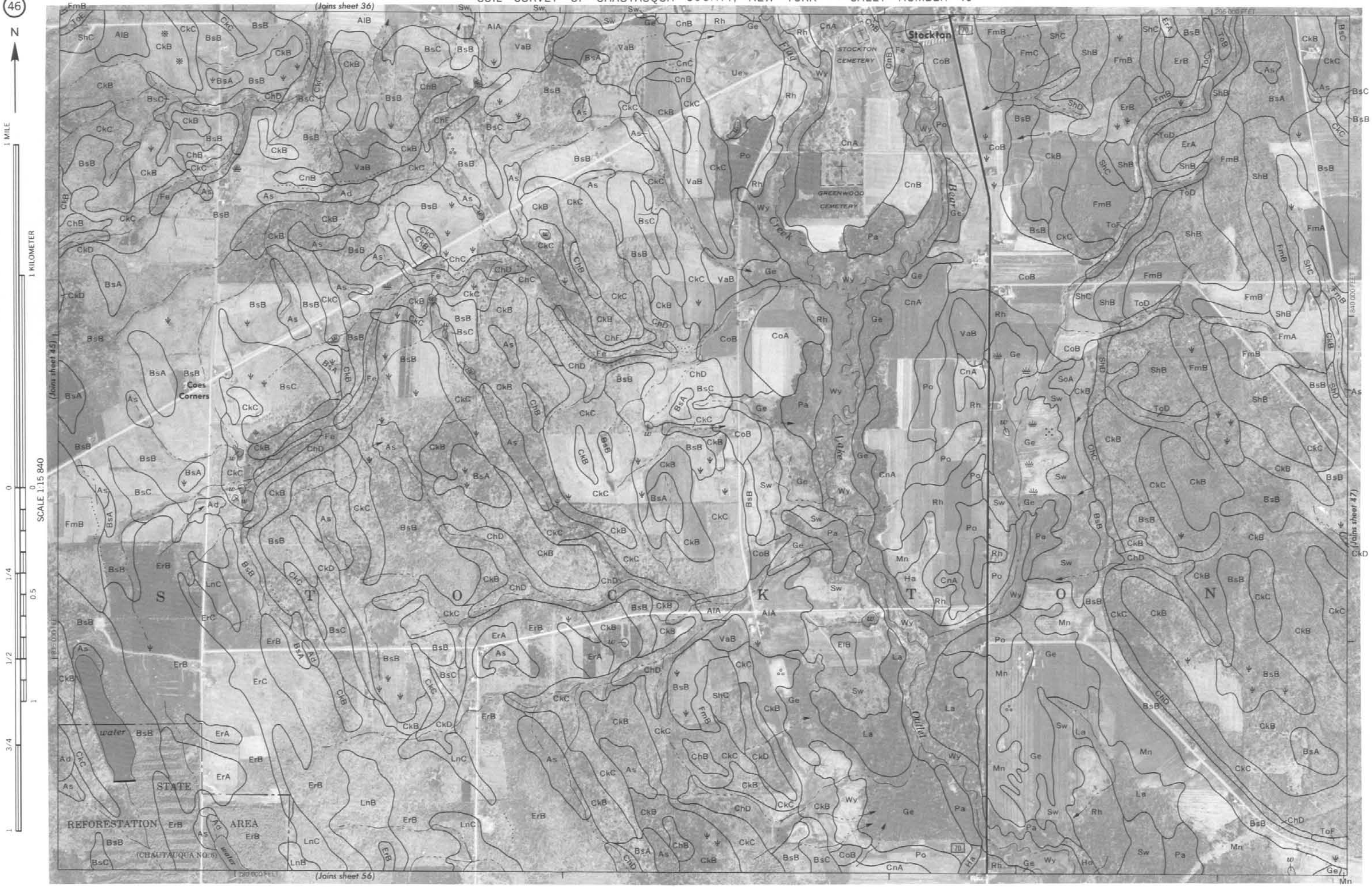

41
N
180 000 FEET
845 000 FEET
LAKE
ERIE
R I P L E Y
(Joins sheet 42)
(Joins sheet 51)
195 000 FEET
835 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
RaA
RaB
Sw
CvB
CnB
CnA
CnD
DkD
OrB
Fe
ElB
ElA
Mn
NgA
NgB
BrB
BrA
Cb
Rh
w
5
76
90


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
LAKE
ERIE
Shore Haven
Forsyth
East Ripley
R I P L E Y
W E S T F I E L D
(Joins inset, sheet 25)
(Joins sheet 43)
(Joins sheet 41)
(Joins sheet 52)
CONRAIL
NORFOLK
WESTERN
water


N
(Joins sheet 33)
(Joins sheet 44)
(Joins sheet 42)
(Joins sheet 53)
220 000 FEET
235 000 FEET
845 000 FEET
WESTFIELD
W E S T F I E L D
OLD ST JAMES CEMETERY
NORFOLK AND WESTERN
CONRAIL
Freelings
Vorce Cr
Creek
Little Chautauqua Creek
Chautauqua
Kent Reservoir
Minton Res
Mount Baldy
THE GULF
Creek
CHAUTAUQUA
water
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

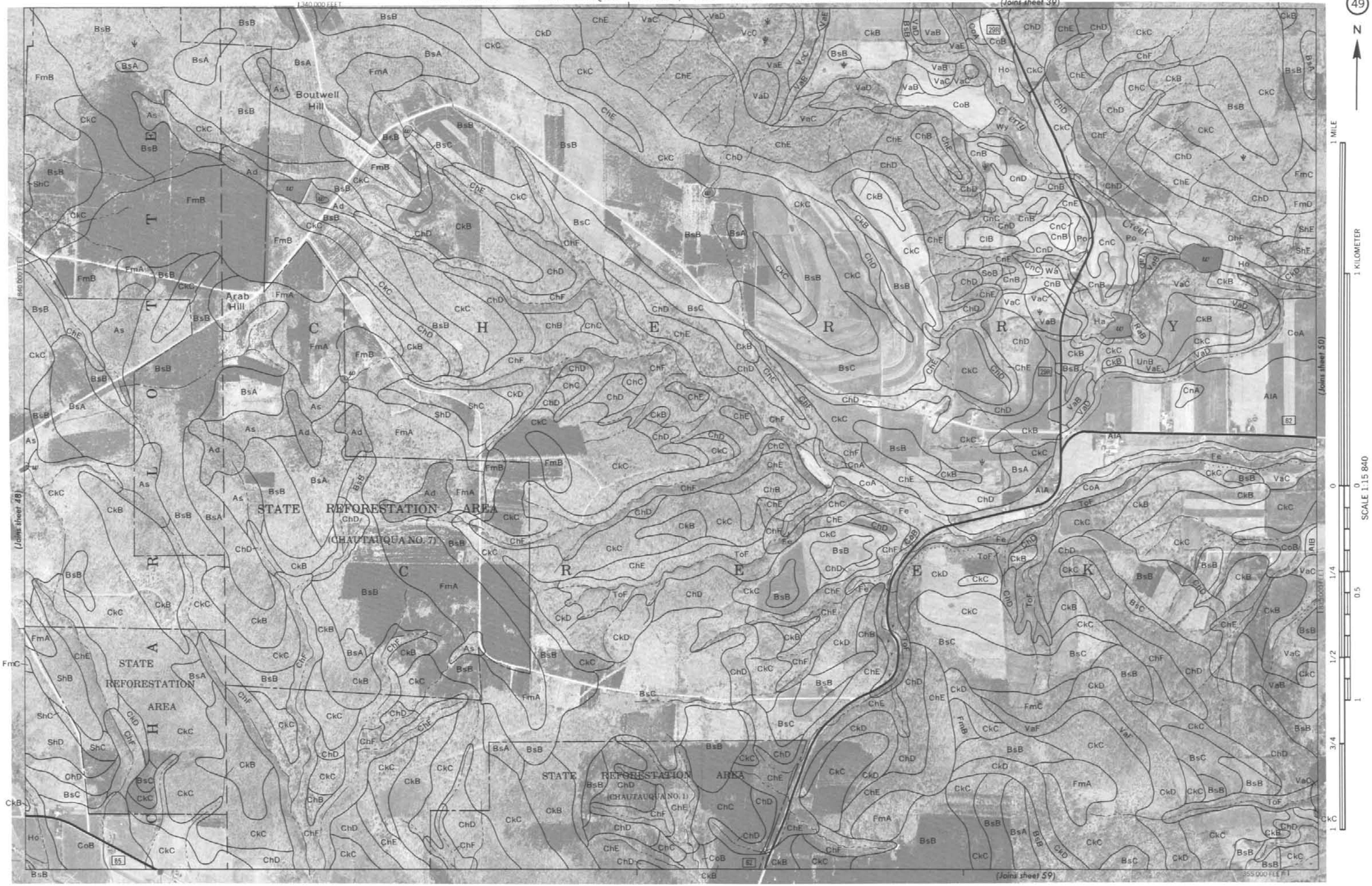

44
N
(Joins sheet 37)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 54)
1 MILE
1 KILOMETER
SCALE 1:15 840
P O R T L A N D
W E S T F I E L D
C H A U T A U Q U A
Elm Flats
Little Chautauqua Creek
Big Inlet
THE GULF
water
394


(Joins sheet 35)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 55)
260 000 FEET
C H A U T A U Q U A
E L L I C O T T O N
Big Inlet
Dewittville Creek
STATE
REFORESTATION
AREA
(CHAUTAUQUA NO. 6)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


46
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 36)
(Joins sheet 45)
(Joins sheet 47)
(Joins sheet 56)
Stockton
STOCKTON CEMETERY
GREENWOOD CEMETERY
Coes Corners
Flag Creek
Bear Lake
Outlet
S T O C K T O N
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 8)
water
70

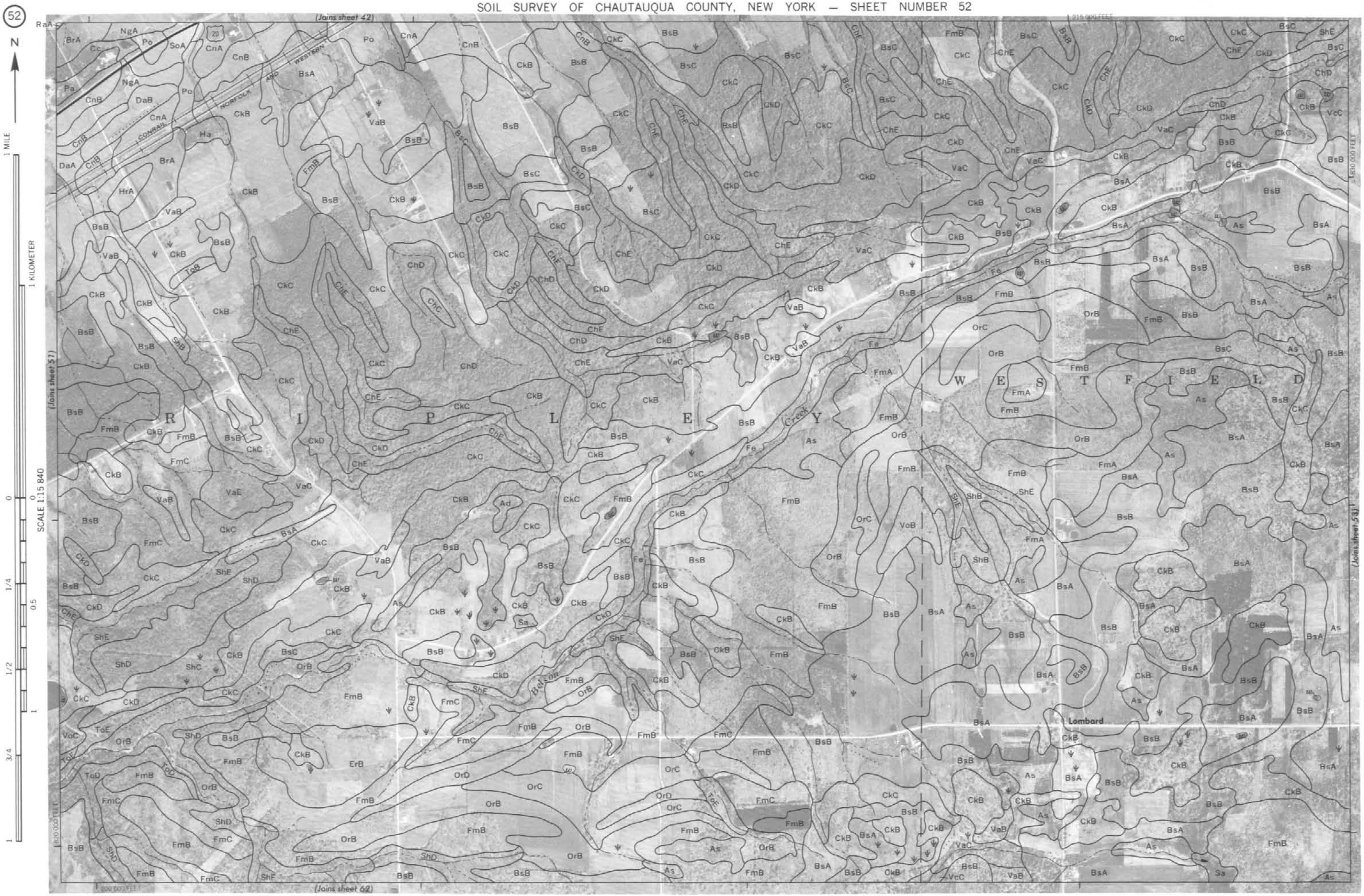

(Joins sheet 37)
(Joins sheet 48)
(Joins sheet 57)
(Joins sheet 46)
300 000 FEET
315 000 FEET
840 000 FEET
835 000 FEET
S T O C K T O N
C H A R L O T T E
Cassadaga Creek
Kabob
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

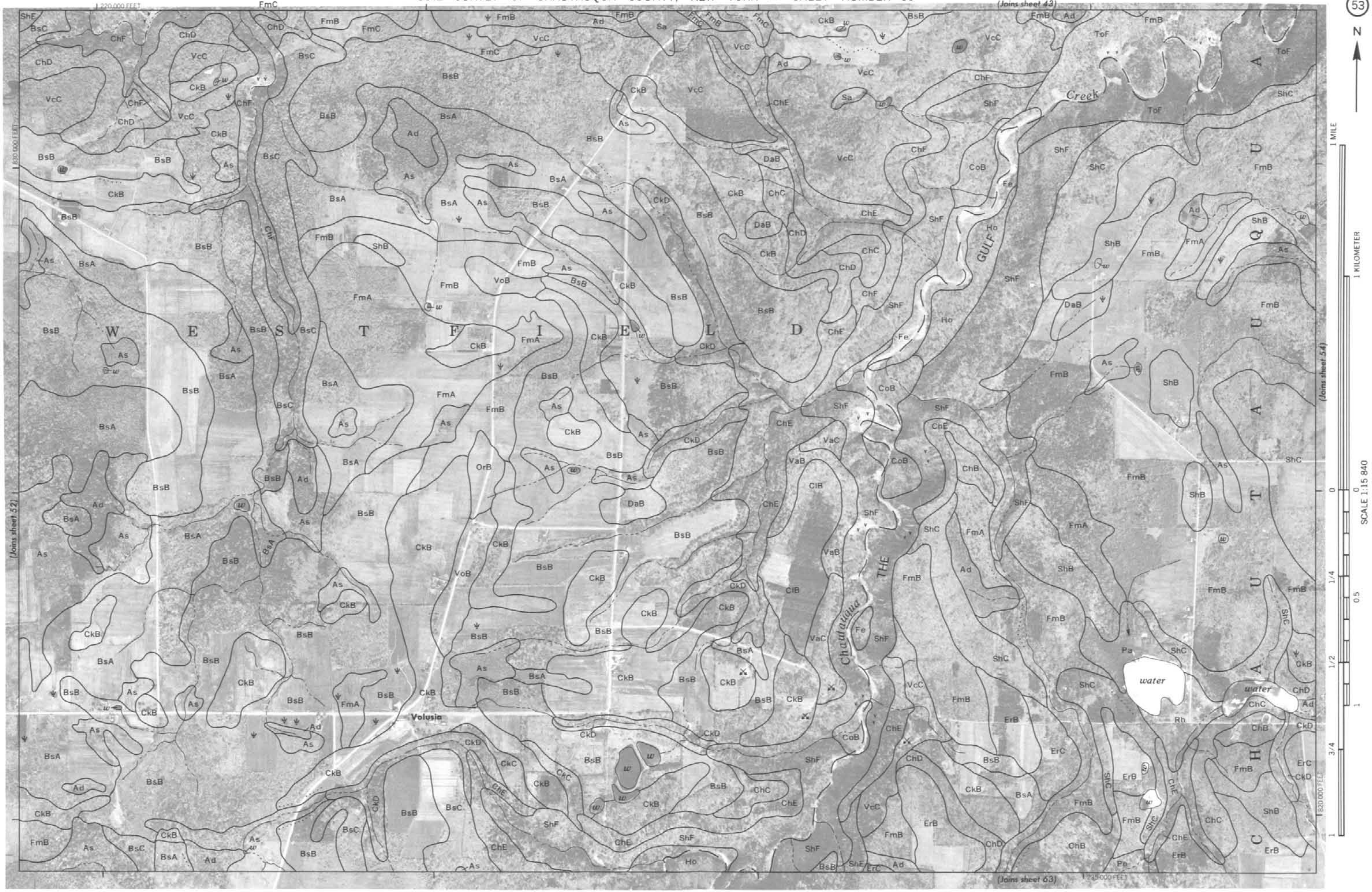

N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 38)
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 58)
Charlotte Center
C H A R L O T T E
Mill Creek
STATE REFORESTATION AREA
SRA


49
N
(Joins sheet 39)
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 59)
1 340 000 FEET
840 000 FEET
355 000 FEET
Boutwell Hill
Arab Hill
CHERRY CREEK
CHERRY CREEK
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 7)
STATE REFORESTATION AREA
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 1)
Cherry Creek
29R
82
85
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


50
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 40)
(Joins sheet 49)
(Joins sheet 60)
370 000 FEET
360 000 FEET
Cherry Creek
C H E R R Y
C R E E K
Cherry
Creek
Conewango
LAKE ERIE
NEW YORK
CATTARAUGUS COUNTY
83
62
Ho
Rh
RaA
AlA
CoA
CnA
UnB
VaB
VaC
VaD
BsB
BsC
CkB
CkC
ChD
ChE
ShC
ShD
ShE
ShF
FmC
FmD
Pa
Hm
Mn
La
Cb
Cc
Ca
Sw
Wa
Ge
ElA
ElB
Rf
RnA
CvB
Sa
Po
Fe
He


51
N
(Joins sheet 41)
(Joins sheet 52)
(Joins sheet 61)
LAKE ERIE
Ripley
R I P L E Y
PENNSYLVANIA
ERIE COUNTY
CONRAIL
NORFOLK AND WESTERN
180 000 FEET
530 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840


52
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 42)
(Joins sheet 51)
(Joins sheet 53)
(Joins sheet 62)
R I P L E Y
W E S T F I E L D
Lombard
Belson Creek
NORFOLK AND WESTERN
CONRAIL
20
215 000 FEET
830 000 FEET
800 000 FEET
200 000 FEET


53
N
(Joins sheet 43)
(Joins sheet 52)
(Joins sheet 54)
(Joins sheet 63)
220 000 FEET
830 000 FEET
745 000 FEET
820 000 FEET
W E S T F I E L D
C H A U T A U Q U A
THE GULF
Creek
Chautauqua
Volusia
water
1 MILE
1 KILOMETER
SCALE 1:15 840

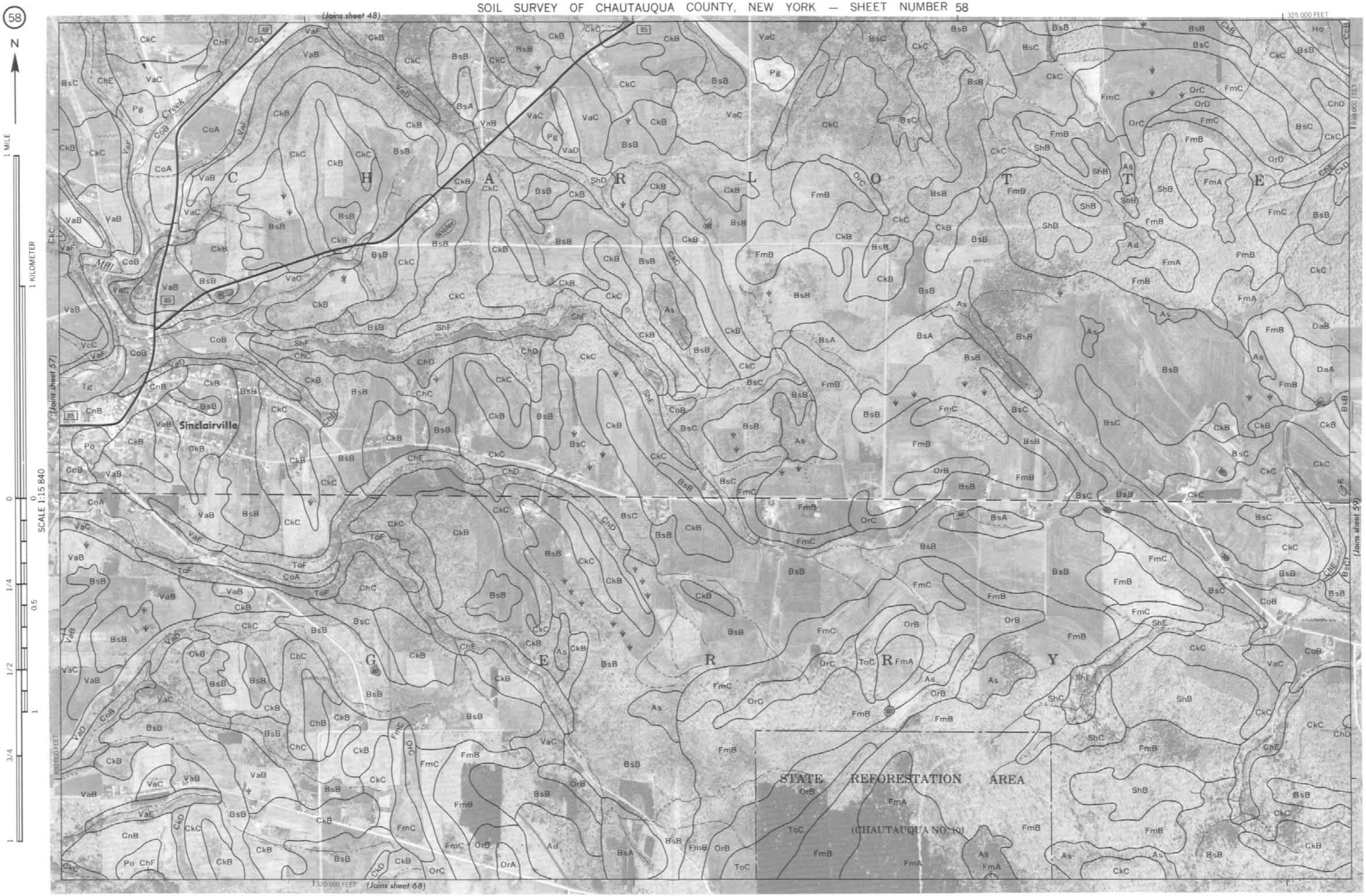

N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 44)
(Joins sheet 53)
(Joins sheet 55)
(Joins sheet 64)
C H A U T A U Q U A
CHAUTAUQUA LAKE
Hartfield
Hartfield Bay
Mayville
(county seat)
Inlet
Big
water
255 000 FEET
240 000 FEET
394
430

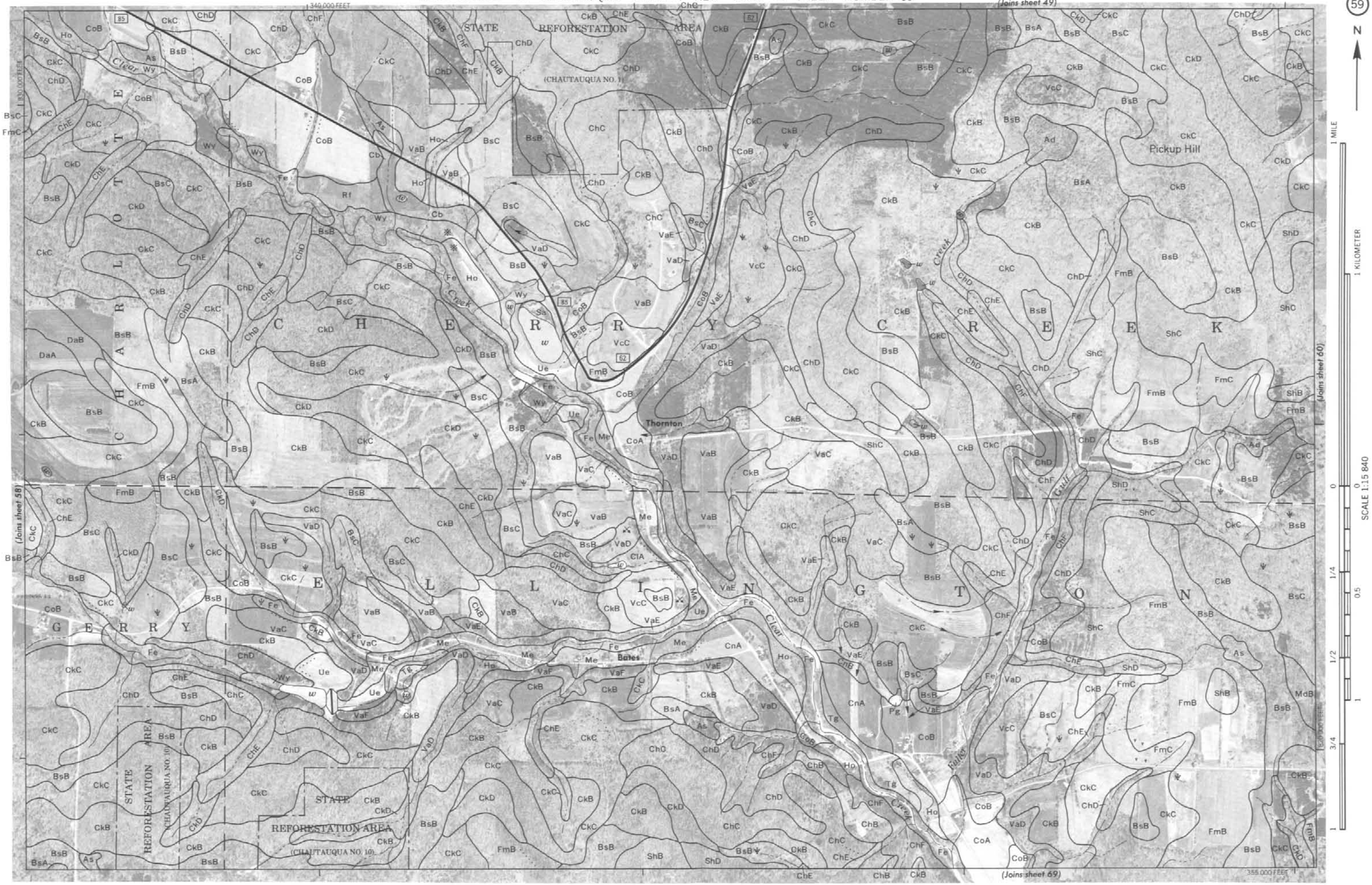

55
N
(Joins sheet 45)
(Joins sheet 54)
(Joins sheet 56)
(Joins sheet 65)
STATE REFORESTATION AREA
CHAUTAUQUA NO. 91
S T O C K T O N
C H A U T A U Q U A
E L L E R Y
Hartfield
Pleasantville
Triangle Camp
Wooglin
Sharelands
Hartfield Bay
CHAUTAUQUA LAKE
Creek
Dewittville
DEWITTVILLE CEM
Inlet
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
1 260 000 FEET
1 270 000 FEET

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 56

(57)


N
(Joins sheet 47)
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 67)
CHARLOTTE
STOCKTON
GERRY
Sinclairville
Bear Lake Outlet
Cassadaga Creek
Mill Creek
Creek
300 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
60
65
70


58
N
(Joins sheet 48)
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 68)
C H A R L O T T E
G E R R Y
Sinclairville
Mill
Creek
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 10)
SCALE 1:15 840
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5
325 000 FEET
320 000 FEET


(Joins sheet 49)
(Joins sheet 60)
(Joins sheet 69)
(Joins sheet 58)
340 000 FEET
355 000 FEET
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 1)
STATE REFORESTATION AREA
(CHAUTAUQUA NO. 10)
CHARLOTTE
CHERRY CREEK
ELLINGTON
GERRY
Pickup Hill
Thornton
Bates
Clear Creek
Fuller Gulf
N
1 MILE
1 KILOMETER
SCALE 1:15 840


60
N
(Joins sheet 50)
(Joins sheet 59)
(Joins sheet 70)
370 000 FEET
360 000 FEET
CHERRY CREEK
ELLINGTON
CATTARAUGUS COUNTY
Gates Corners
Kings School Corner
Creek
Mill Run
Brook
Conewango
NEW YORK AND LAKE ERIE
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

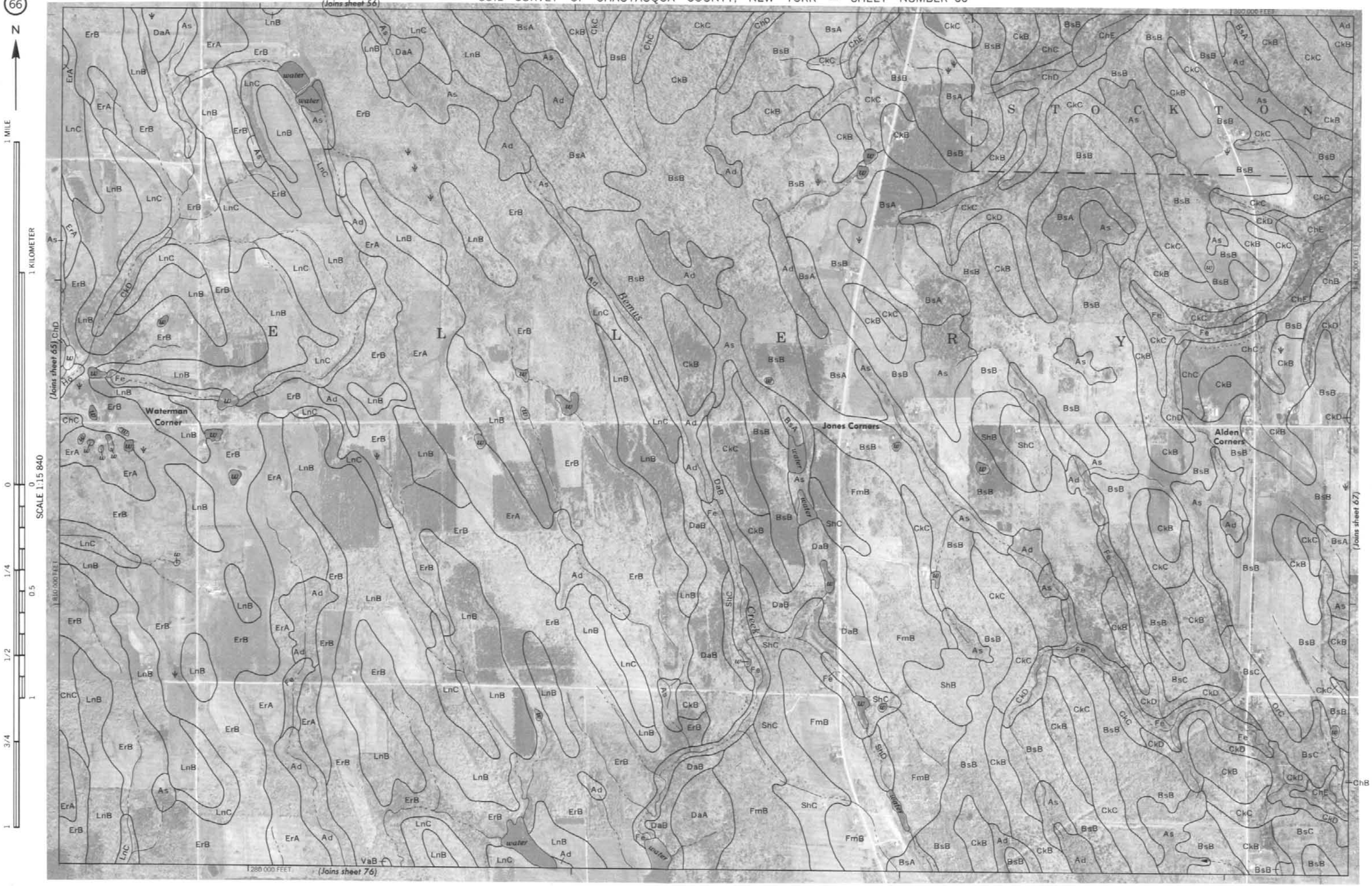

(Joins sheet 51)
(Joins sheet 62)
(Joins sheet 71)
61
N
GAGE GULF
RIPLEY
Twentymile Creek
PENNSYLVANIA
ERIE COUNTY
CONRAIL
NORFOLK AND WESTERN
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

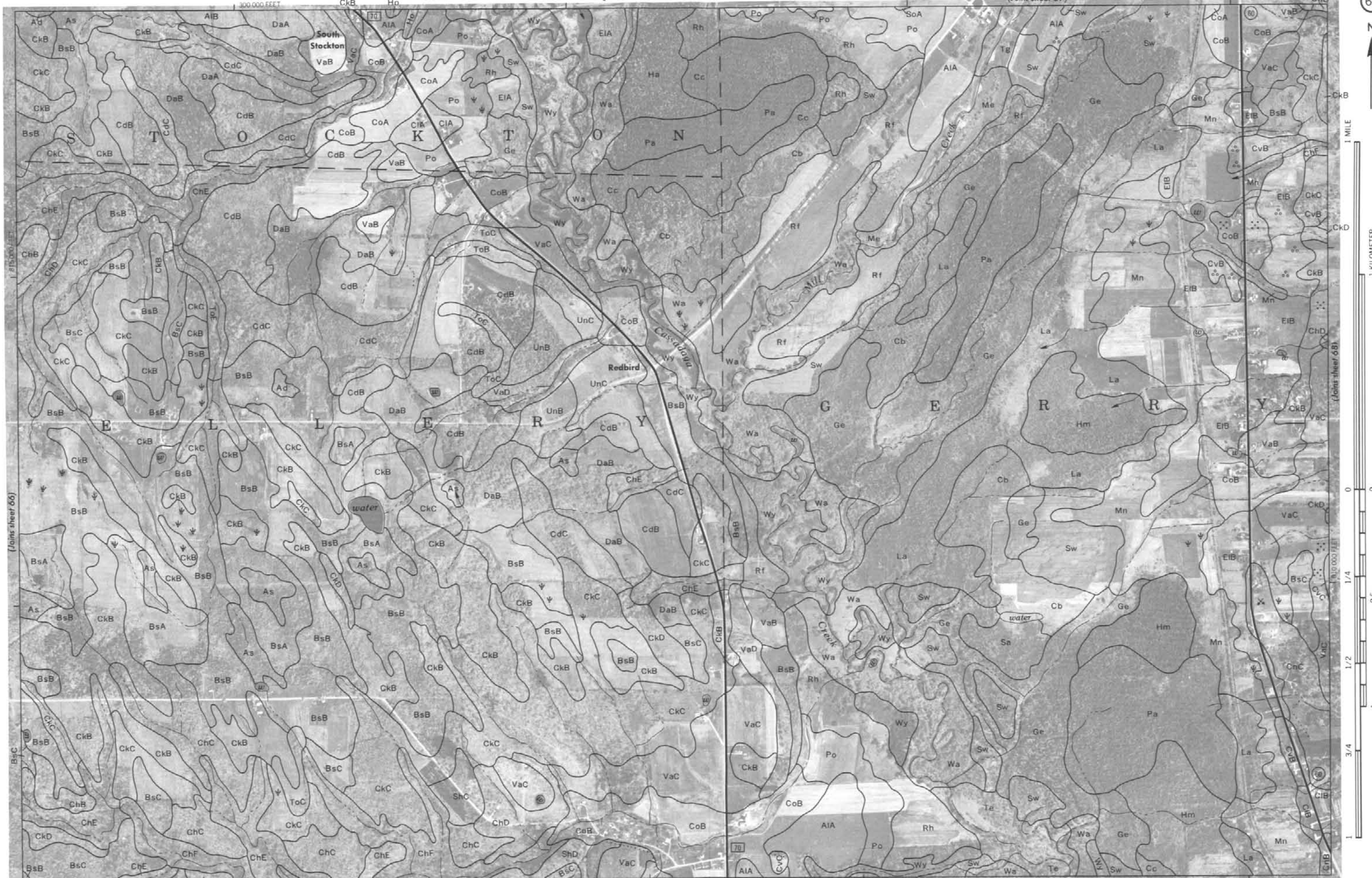
SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 62


63
N
(Joins sheet 53)
(Joins sheet 64)
(Joins sheet 62)
(Joins sheet 73)
220 000 FEET
235 000 FEET
STATE
REFORESTATION
AREA
W E S T F I E L D
C H A U T A U Q U A
PORTER CEMETERY
Summerdale
Creek
Chautauqua
1 MILE
1 KILOMETER
SCALE 1:15 840


(Joins sheet 54)
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 74)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
255 000 FEET
815 000 FEET
810 000 FEET
740 000 FEET
Mayville
Lakeside Park
Point Pleasant
Cottage Park
Lighthouse Point
Irwins Bay
Wahmeda
CHAUTAUQUA
LAKE
C H A U T A U Q U A
STATE
REFORESTATION
AREA
430
394


N
260 000 FEET
815 000 FEET
275 000 FEET
(Joins sheet 55)
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 75)
C H A U T A U Q U A
E L L E R Y
CHAUTAUQUA
LAKE
Dewittville Bay
Point Chautauqua
Dewittville
DEWITTVILLE CEMETERY
Dewittville Creek
Wahmeda
Chautauqua
Chedwel
water
430
394
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


(Joins sheet 56)
(Joins sheet 65)
(Joins sheet 67)
(Joins sheet 76)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
S T O C K T O N
E L L E R Y
Waterman Corner
Jones Corners
Alden Corners
Bemus Creek
300 000 FEET
280 000 FEET
810 000 FEET


67
(Joins sheet 57)
(Joins sheet 66)
(Joins sheet 68)
(Joins sheet 77)
300 000 FEET
315 000 FEET
S T O C K T O N
E L L E R Y
G E R R Y
South Stockton
Redbird
Cassadaga
Mill Creek
Creek
water
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
60
70


N
(Joins sheet 58)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 78)
STATE REFORESTATION AREA
G E R R Y
STATE REFORESTATION AREA
STATE REFORESTATION AREA
GERRY HILL CEMETERY
Hatch Creek
Folsom Creek
Creek
385 000 FEET
810 000 FEET
320 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 69

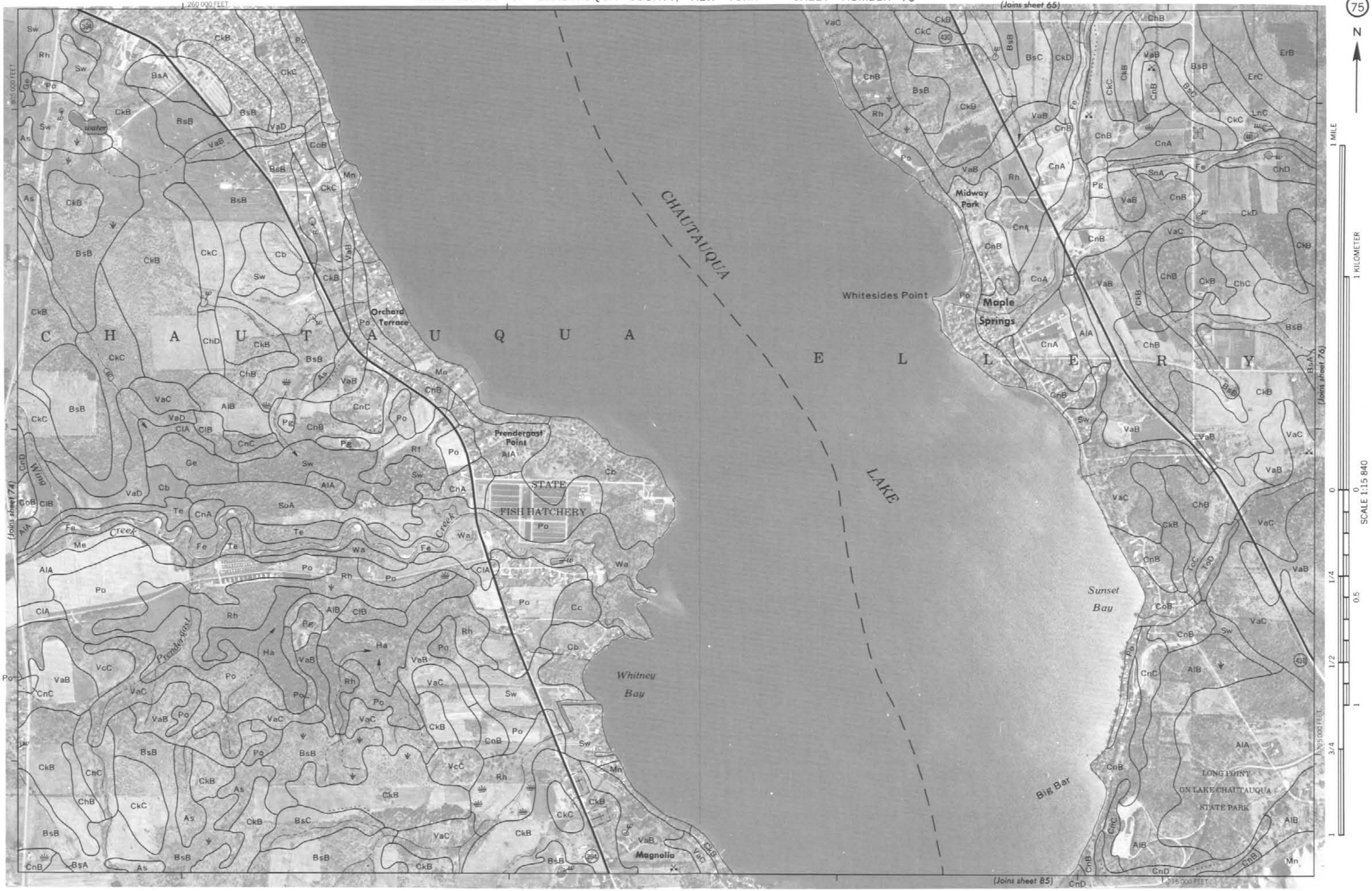

(Joins sheet 60)
(Joins sheet 69)
(Joins sheet 80)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
E L L I N G T O N
Conewango Valley
Clear Creek
Ellington
Allen Brook
Clear Creek
Twentyeighth Creek
CATTARAUGUS COUNTY

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 71

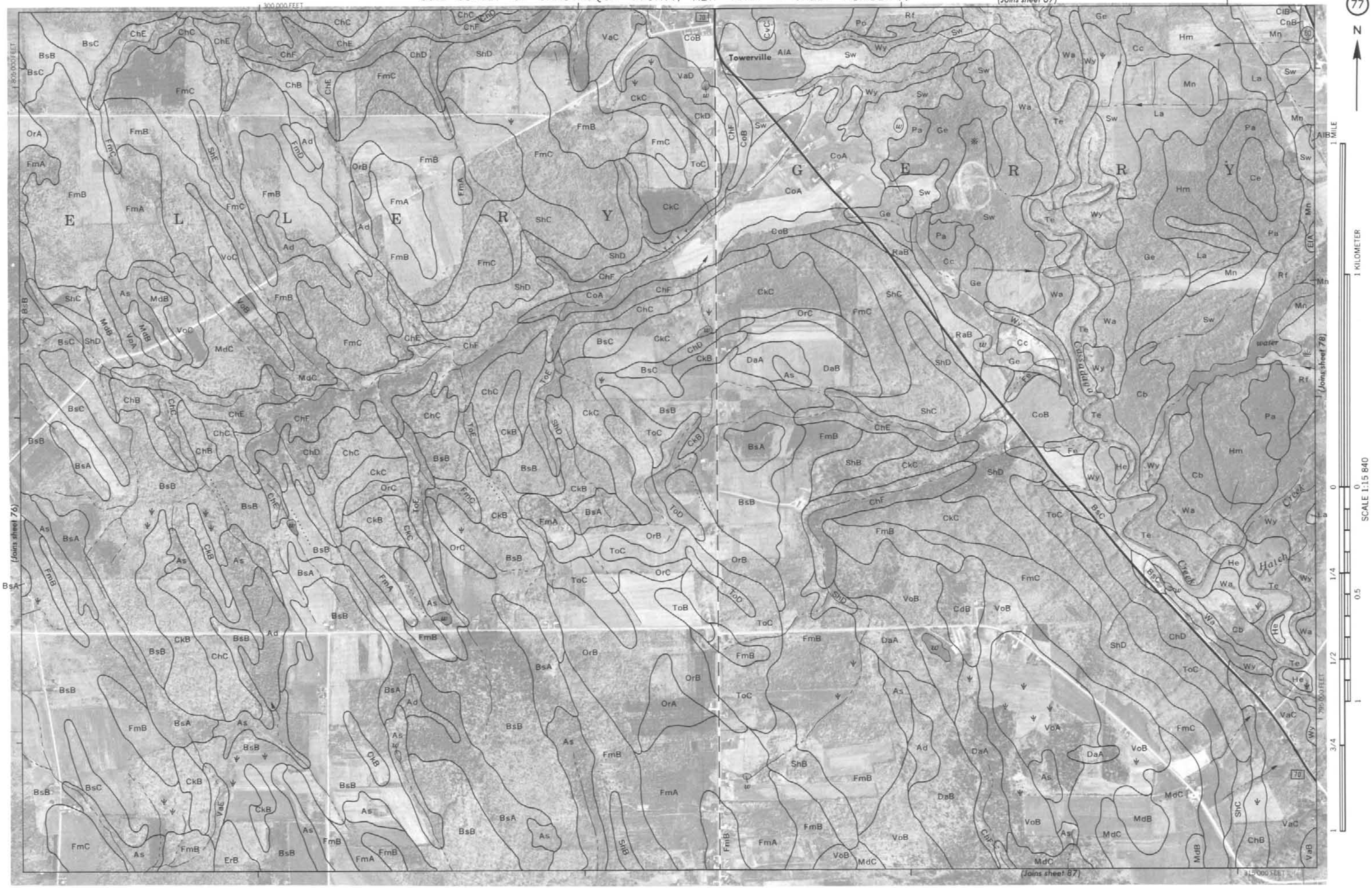

72
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 62)
(Joins sheet 71)
(Joins sheet 73)
(Joins sheet 82)
215 000 FEET
200 000 FEET
795 000 FEET
R I P L E Y
W E S T F I E L D
MINA
Twentymile
Creek
Sheldon Corners
Raters Corners
78
water


73
N
(Joins sheet 63)
(Joins sheet 83)
(Joins sheet 72)
(Joins sheet 74)
W E S T F I E L D
C H A U T A U Q U A
STATE REFORESTATION AREA
1 MILE
1 KILOMETER
SCALE 1:15 840
water


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 64)
(Joins sheet 84)
(Joins sheet 73)
(Joins sheet 75)
255 000 FEET
240 000 FEET
STATE
REFORESTATION
AREA
C H A U T A U Q U A
Wing
Creek
Prendergast
water

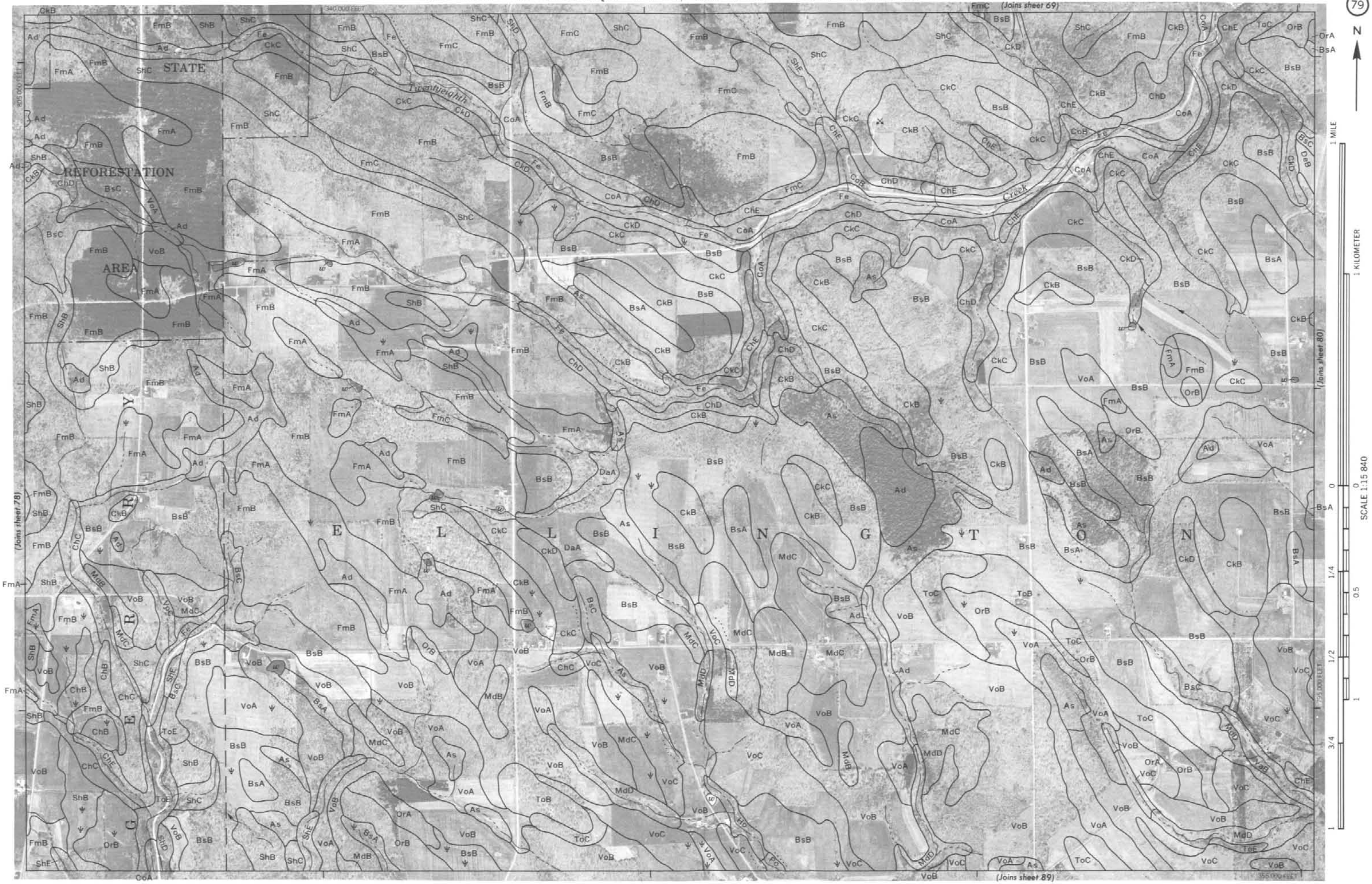

75
N
(Joins sheet 65)
(Joins sheet 74)
(Joins sheet 76)
(Joins sheet 85)
260 000 FEET
805 000 FEET
775 000 FEET
795 000 FEET
CHAUTAUQUA LAKE
C H A U T A U Q U A
E L L E R Y
Orchard Terrace
Prendergast Point
STATE FISH HATCHERY
Whitesides Point
Maple Springs
Midway Park
Whitney Bay
Sunset Bay
Big Bar
Magnolia
LONG POINT ON LAKE CHAUTAUQUA STATE PARK
Wing Creek
Prendergast Creek
water
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


76
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 66)
(Joins sheet 75)
(Joins sheet 77)
(Joins sheet 86)
295 000 FEET
280 000 FEET
E L L E R Y
West Ellery
Ellery Center
Willow Brook
Bayview
Bemus Bay
CHAUTAUQUA LAKE
Bemus Creek
Browns Creek
Creek
430

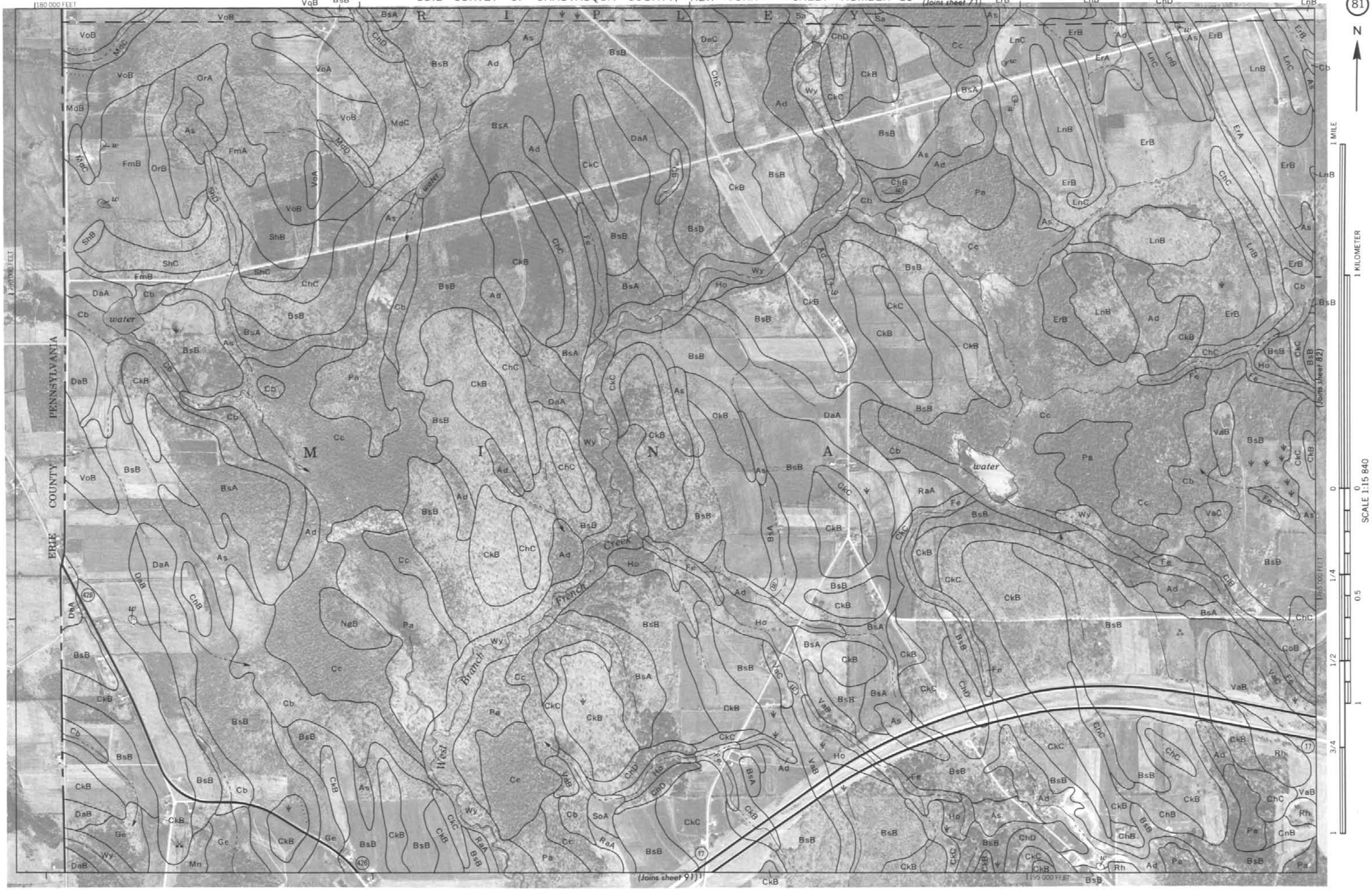


(Joins sheet 67)
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 87)
77
N
Towerville
E L L E R Y
G E R R Y
Cassadaga
Hatch Creek
Creek
water
300 000 FEET
805 000 FEET
315 000 FEET
795 000 FEET
70
60
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


78
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 68)
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 88)
335 000 FEET
320 000 FEET
805 000 FEET
795 000 FEET
STATE
REFORESTATION
AREA
G E R R Y
Gerry
Hatch
Creek
Cassadaga
Creek
Folsom
Creek
MAPLE GROVE CEM.

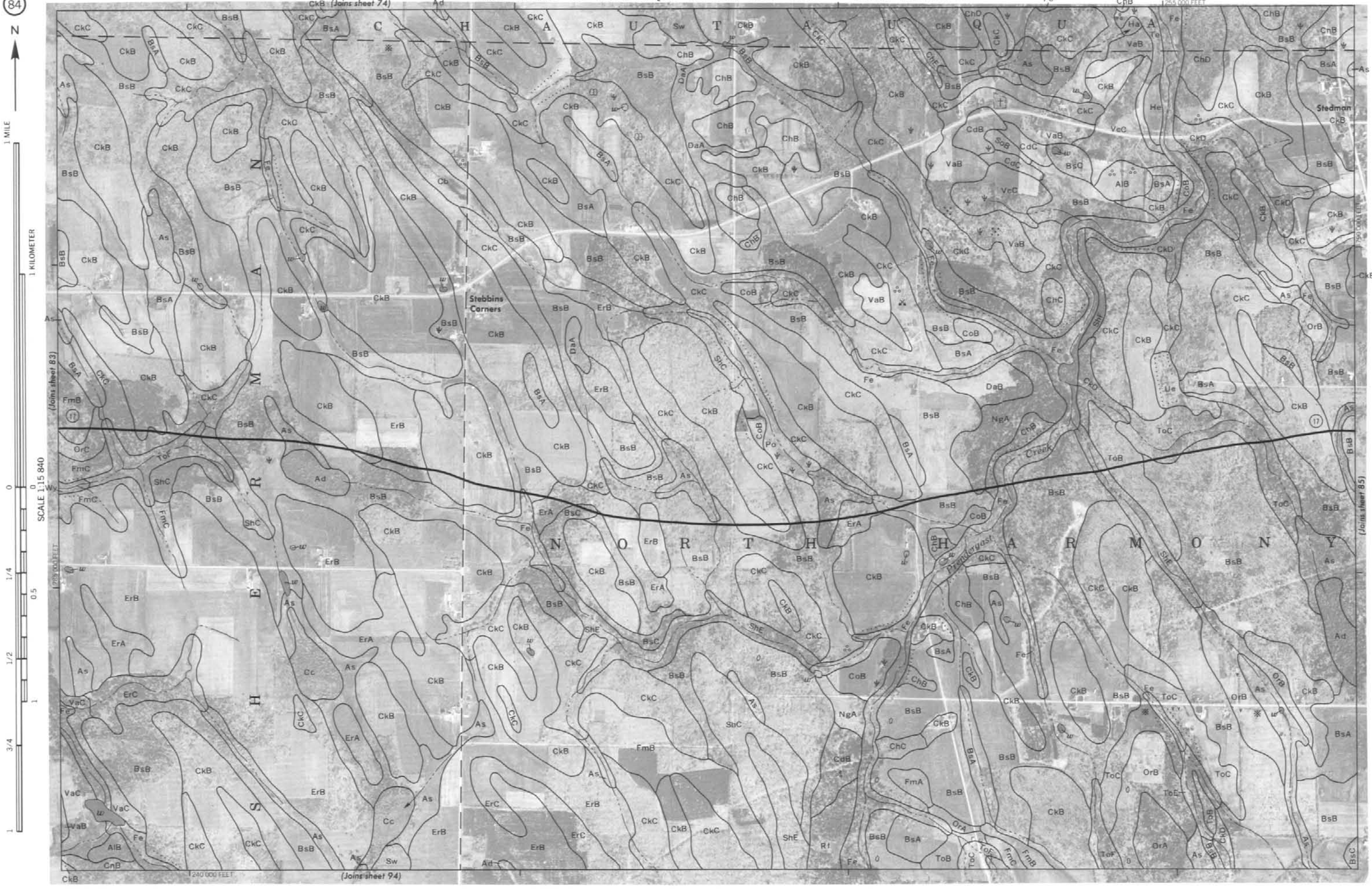

79
N
(Joins sheet 69)
(Joins sheet 78)
(Joins sheet 80)
(Joins sheet 89)
STATE
REFORESTATION
AREA
E L L I N G T O N
Twentyeighth
Creek
340 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840

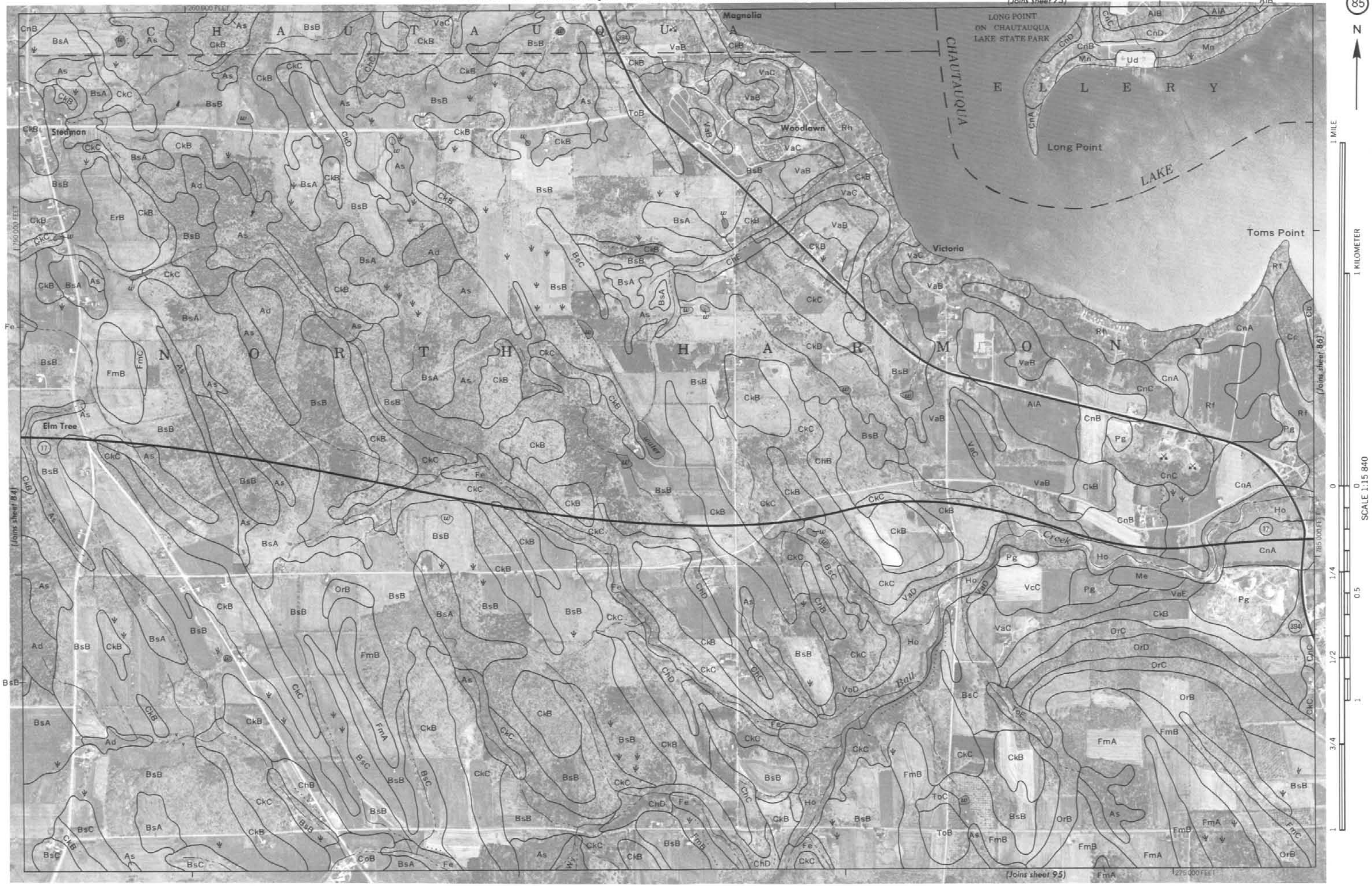

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 70)
(Joins sheet 79)
(Joins sheet 90)
370 000 FEET
355 000 FEET
795 000 FEET
E L L I N G T O N
CATTARAUGUS COUNTY
Indian Brook
Harris Brook
Brook
water
82

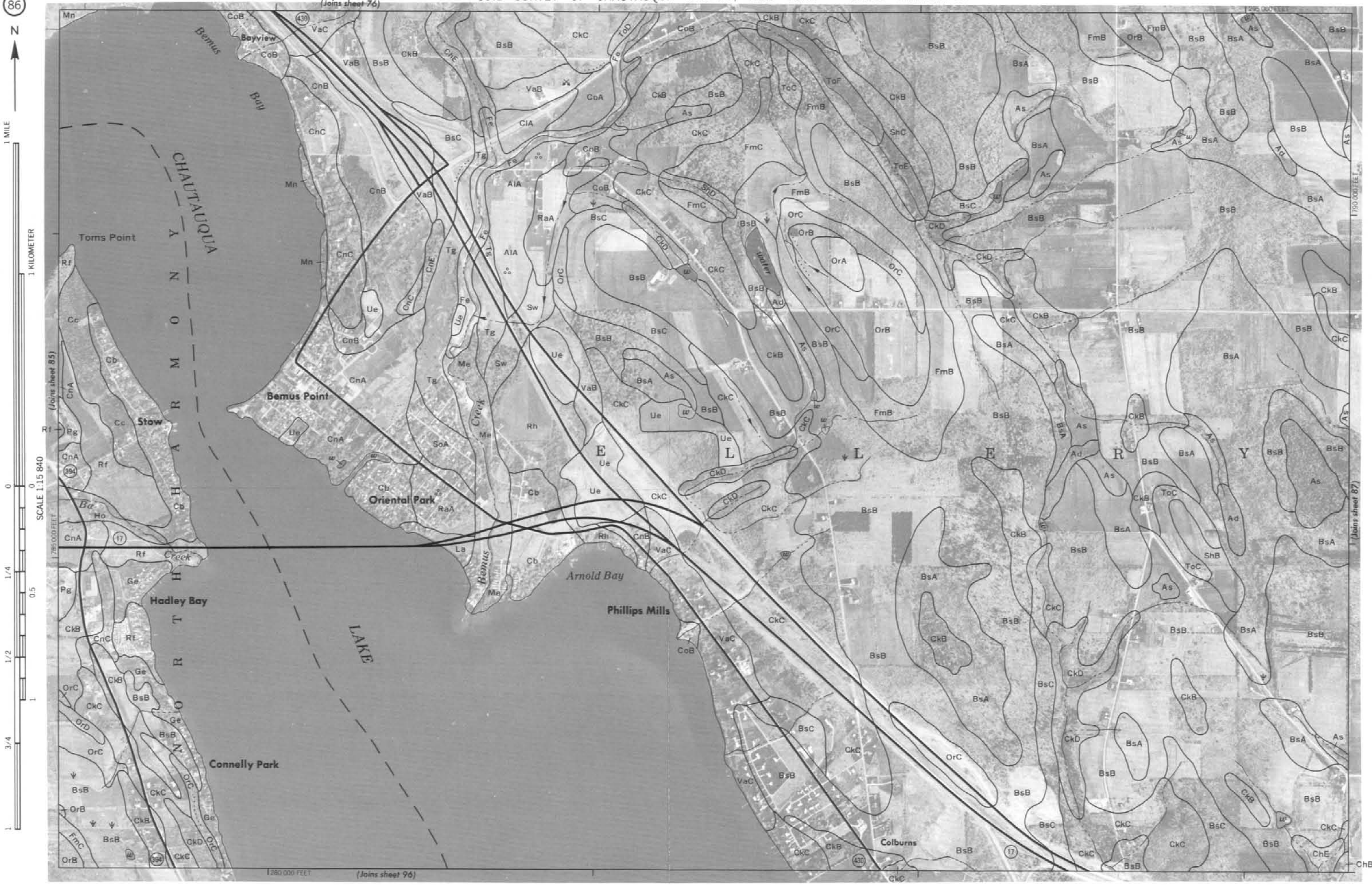

(Joins sheet 71)
(Joins sheet 82)
(Joins sheet 91)
180 000 FEET
195 000 FEET
R I P L E Y
M I N A
PENNSYLVANIA
ERIE COUNTY
French Creek
West Branch
water
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


RIPLEY
WESTFIELD
(Joins sheet 72)
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 92)
M I N A
S H E R M A N
Beaver Marsh
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
215 000 FEET
285 000 FEET
200 000 FEET
750 000 FEET


83
N
WESTFIELD
STATE REFORESTATION AREA
(Joins sheet 73)
(Joins sheet 82)
(Joins sheet 84)
(Joins sheet 93)
Sherman
French Creek
220 000 FEET
235 000 FEET
750 000 FEET
765 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 74)
(Joins sheet 83)
(Joins sheet 85)
(Joins sheet 94)
255 000 FEET
240 000 FEET
CHAUTAUQUA
SHERMAN
NORTH HARMONY
Stebbins Corners
Stedman
Prendergast Creek


85
N
(Joins sheet 75)
(Joins sheet 84)
(Joins sheet 86)
(Joins sheet 95)
260 000 FEET
270 000 FEET
750 000 FEET
765 000 FEET
CHAUTAUQUA
ELLERY
NORTH HARMONY
CHAUTAUQUA
LAKE
LONG POINT ON CHAUTAUQUA LAKE STATE PARK
Long Point
Toms Point
Magnolia
Woodlawn
Victoria
Stedman
Elm Tree
Creek
Ball
water
17
394
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 76)
(Joins sheet 85)
(Joins sheet 87)
(Joins sheet 96)
295 000 FEET
790 000 FEET
785 000 FEET
280 000 FEET
Bayview
Bemus Bay
CHAUTAUQUA LAKE
Toms Point
Stow
Bemus Point
Oriental Park
Bemus Creek
Arnold Bay
Phillips Mills
Hadley Bay
Connelly Park
Colburns
HARMONY
NORTH HARMONY
ELLERY
Ba Creek
water


87
N
300 000 FEET
(Joins sheet 77)
(Joins sheet 86)
(Joins sheet 88)
(Joins sheet 97)
790 000 FEET
760 000 FEET
315 000 FEET
G E R R Y
E L L E R Y
E L L I C O T T
Dutch Hollow Creek
CHAUTAUQUA COUNTY AIRPORT
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


88
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 78)
(Joins sheet 87)
(Joins sheet 89)
(Joins sheet 98)
320 000 FEET
335 000 FEET
G E R R Y
E L L I C O T T
Harris Hill
Ross Mills
CHAUTAUQUA COUNTY AIRPORT
Cassadaga Creek
Folsom Creek
CASSADAGA CREEK
60
70

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 89

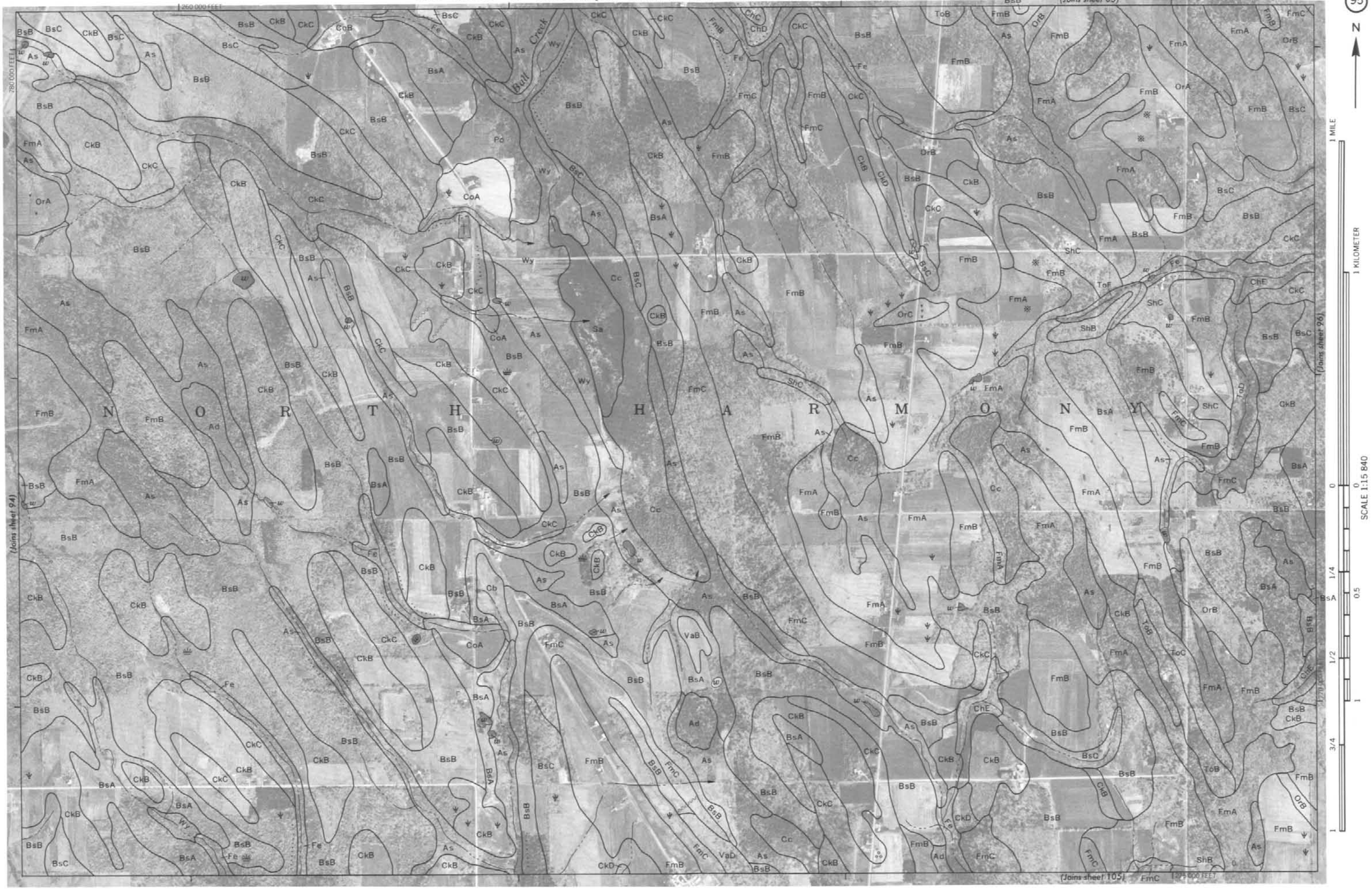

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 80)
(Joins sheet 89)
(Joins sheet 100)
370 000 FEET
355 000 FEET
780 000 FEET
E L L I N G T O N
P O L A N D
CATTARAUGUS COUNTY
Waterboro
Schermerhorn Corners
Kennedy
CONEWANGO CREEK
Indian Brook
Harris Brook
water
62
394
17

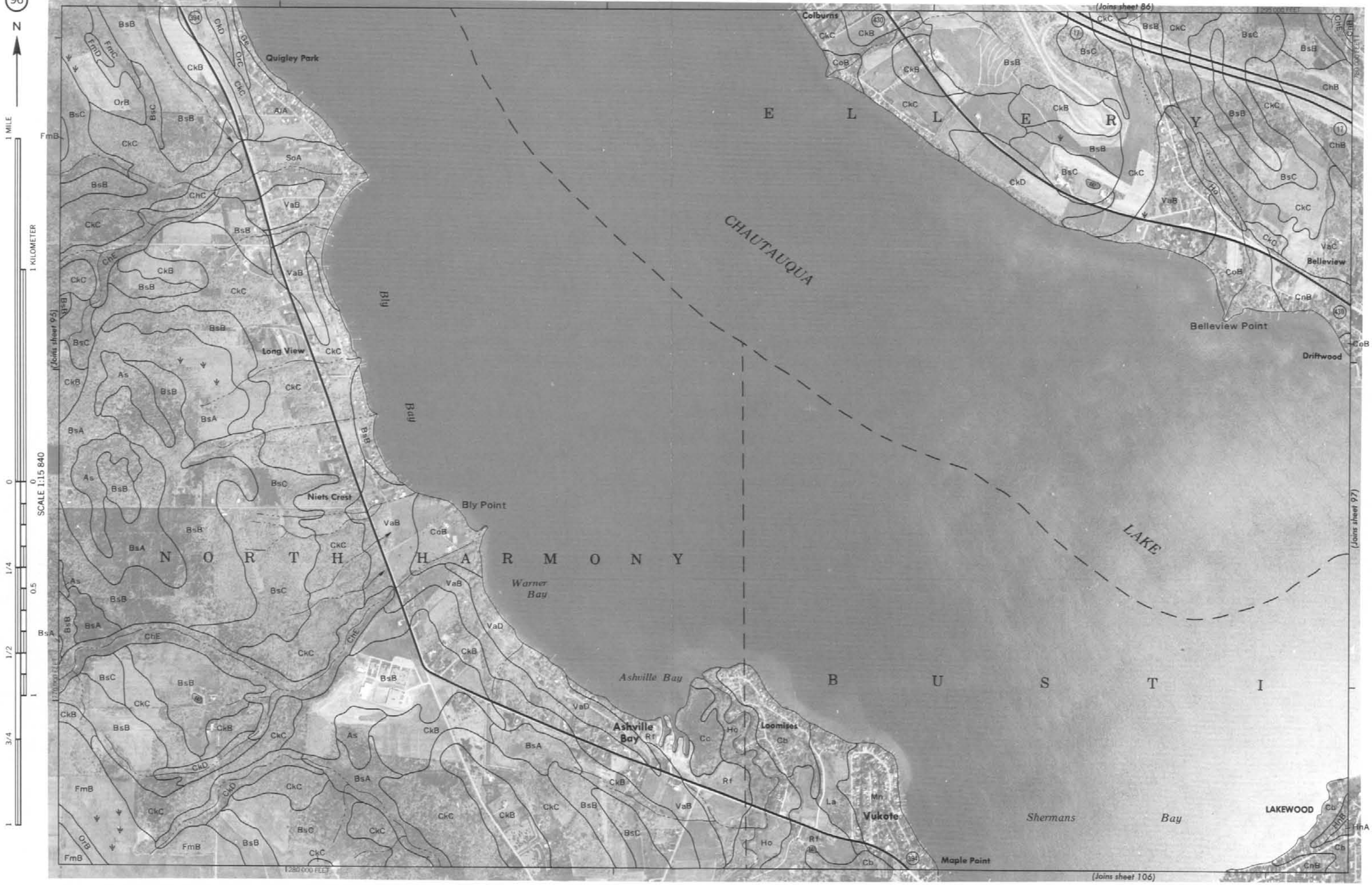

(Joins sheet 81)
(Joins sheet 92)
(Joins sheet 101)
180 000 FEET
195 000 FEET
170 000 FEET
West Branch French Creek
Findley Lake
FINDLEY LAKE
M I N A
ERIE COUNTY
PENNSYLVANIA
Camp Findley
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


92
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 82)
(Joins sheet 91)
(Joins sheet 93)
(Joins sheet 102)
Mina
M I N A
S H E R M A N
Beaver Marsh
French Creek
218 000 FEET
200 000 FEET
170 000 FEET


93
N
(Joins sheet 83)
(Joins sheet 92)
(Joins sheet 94)
(Joins sheet 103)
220 000 FEET
780 000 FEET
770 000 FEET
235 000 FEET
Slab City
Wait Corners
SHERMAN
Perkins Swamp
French Cr
French Creek
Alder Bottom Creek
water
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
76


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 84)
(Joins sheet 93)
(Joins sheet 95)
(Joins sheet 104)
255 000 FEET
720 000 FEET
240 000 FEET
HARMONY
NORTH HARMONY
STATE
REFORESTATION
(CHAUTAUQUA NO. 11)
AREA
STATE
REFORESTATION
AREA
Prendergast
Creek
Goose
Creek
water


95
N
(Joins sheet 85)
(Joins sheet 94)
(Joins sheet 96)
(Joins sheet 105)
260 000 FEET
280 000 FEET
N O R T H H A R M O N Y
Bull Creek
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


96
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 86)
(Joins sheet 95)
(Joins sheet 97)
(Joins sheet 106)
Quigley Park
Colburns
E L L E R Y
CHAUTAUQUA
Bly Bay
Long View
Belleview
Belleview Point
Driftwood
Niets Crest
Bly Point
N O R T H   H A R M O N Y
Warner Bay
LAKE
Ashville Bay
Ashville Bay
Loomises
B U S T I
Vukote
Shermans Bay
LAKEWOOD
Maple Point


97
N
(Joins sheet 87)
(Joins sheet 96)
(Joins sheet 98)
(Joins sheet 107)
300 000 FEET
345 000 FEET
780 000 FEET
770 000 FEET
E L L E R Y
E L L I C O T T
B U S T I
CHAUTAUQUA
LAKE
CHADAKOIN
RIVER
Belleview
Driftwood
Griffiths
Greenhurst
Point Stockholm
Sheldon Hall
Sunnyside
Elmhurst
Fluvanna
Bonita
Longview
Celoron
JAMESTOWN
LAKEWOOD
Burtis
Bay
17
430
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

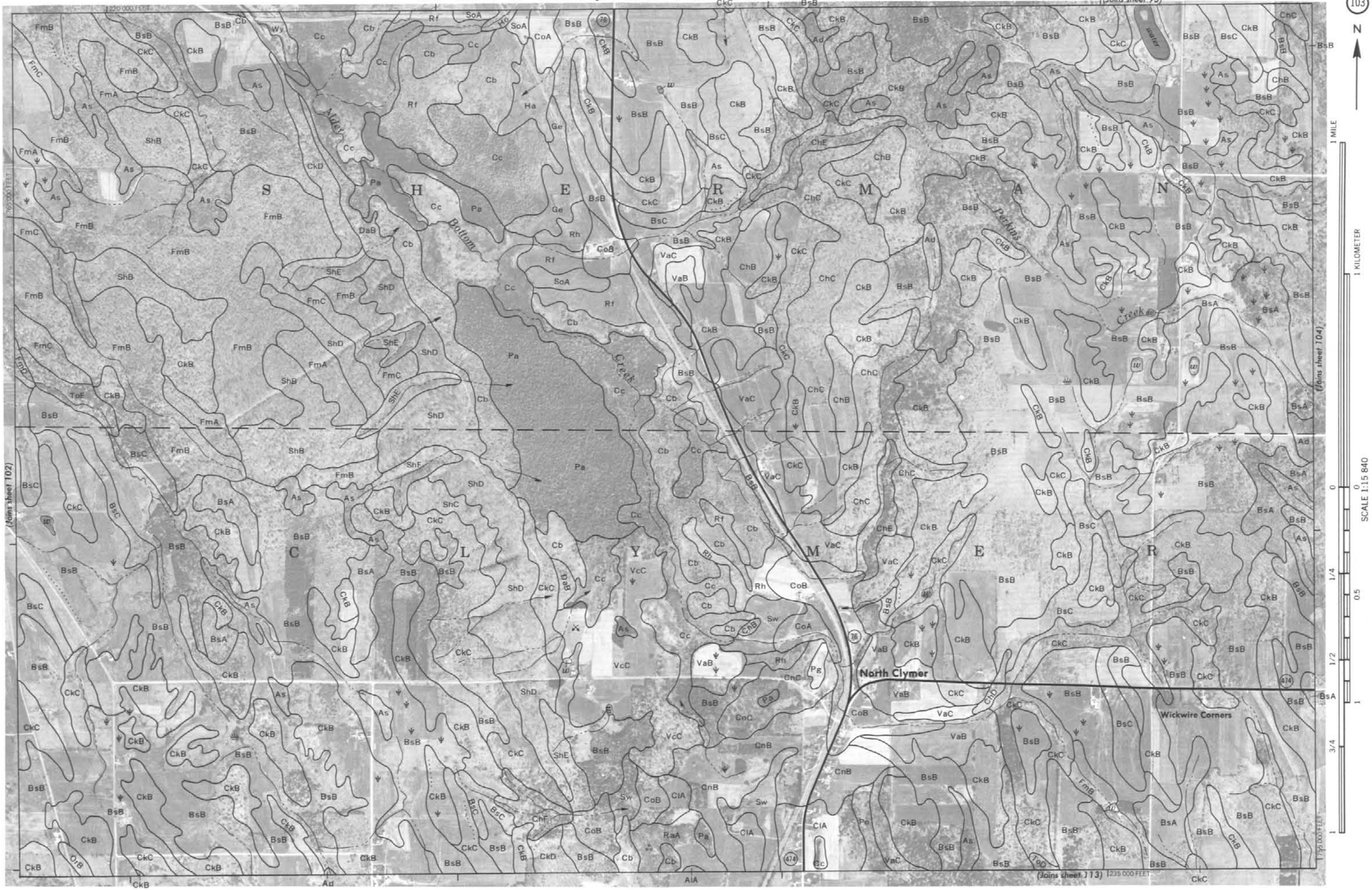

N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 88)
(Joins sheet 97)
(Joins sheet 99)
(Joins sheet 108)
E L L I C O T T
JAMESTOWN
FALCONER
Moon Brook
CASSADAGA CREEK
CHADAKOIN RIVER


99
N
(Joins sheet 89)
(Joins sheet 109)
(Joins sheet 98)
(Joins sheet 100)
340 000 FEET
350 000 FEET
780 000 FEET
770 000 FEET
Poland Center
Hartson
Swamp
CASSADAGA
CASSADAGA
CREEK
CHADAKOIN
RIVER
CONEWANGO
CREEK
CREEK
Dry
Brook
water
P O L A N D
E L L I C O T T
SCALE 1:15 840
1 MILE
1 KILOMETER
0
1/4
0.5
1/2
3/4
1


100
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 90)
(Joins sheet 99)
(Joins sheet 110)
370 000 FEET
355 000 FEET
CONEWANGO CREEK
Mud Creek
Elkins Brook
water
Clark
P O L A N D
CATTARAUGUS COUNTY
17
394
62

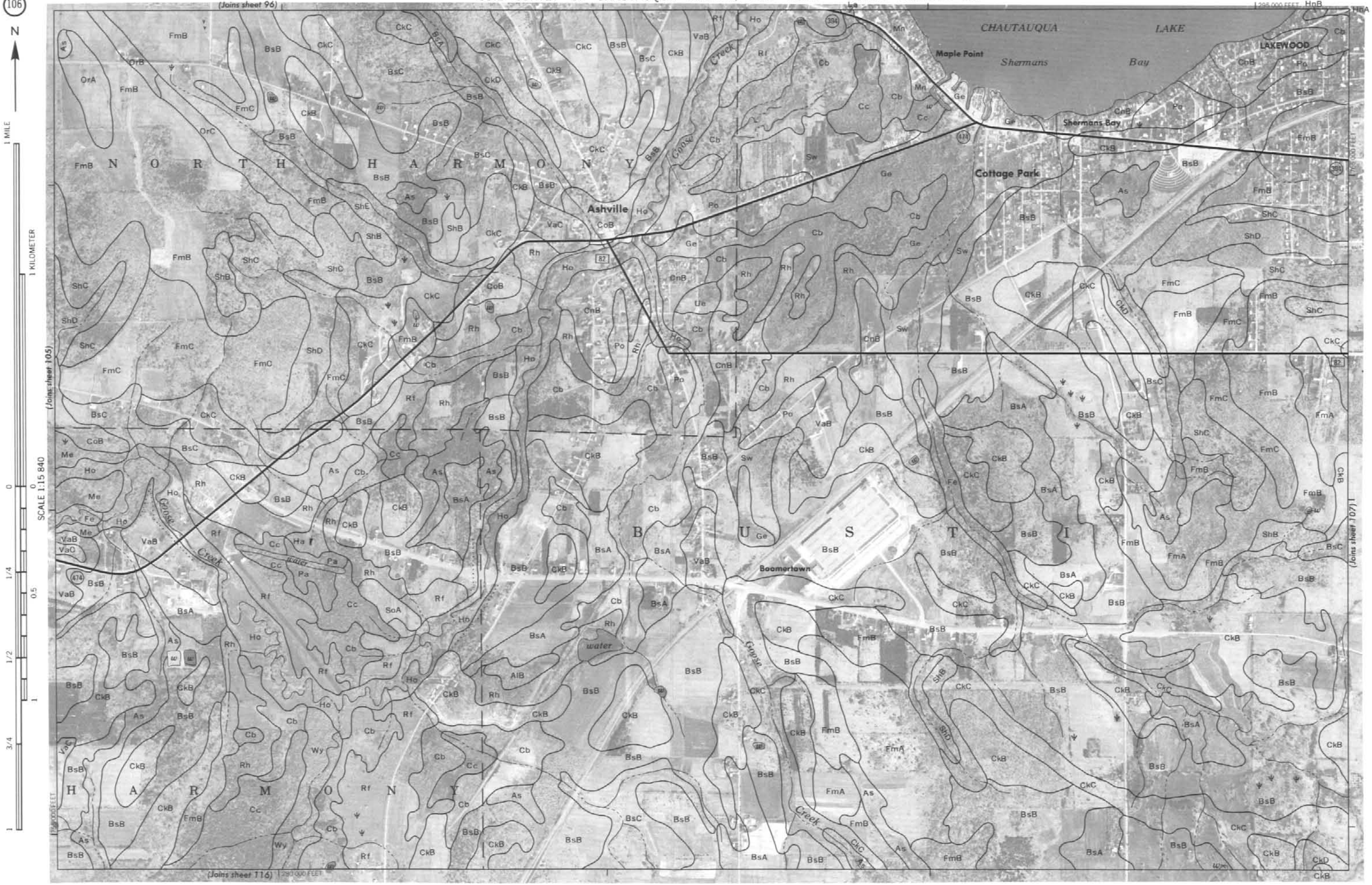

(Joins sheet 91)
(Joins sheet 102)
(Joins sheet 111)
180 000 FEET
765 000 FEET
195 000 FEET
FINDLEY LAKE
MINA
FRENCH CREEK
Black Brook
French Creek
PENNSYLVANIA
ERIE COUNTY
101
N
1 MILE
1 KILOMETER
SCALE 1:15 840

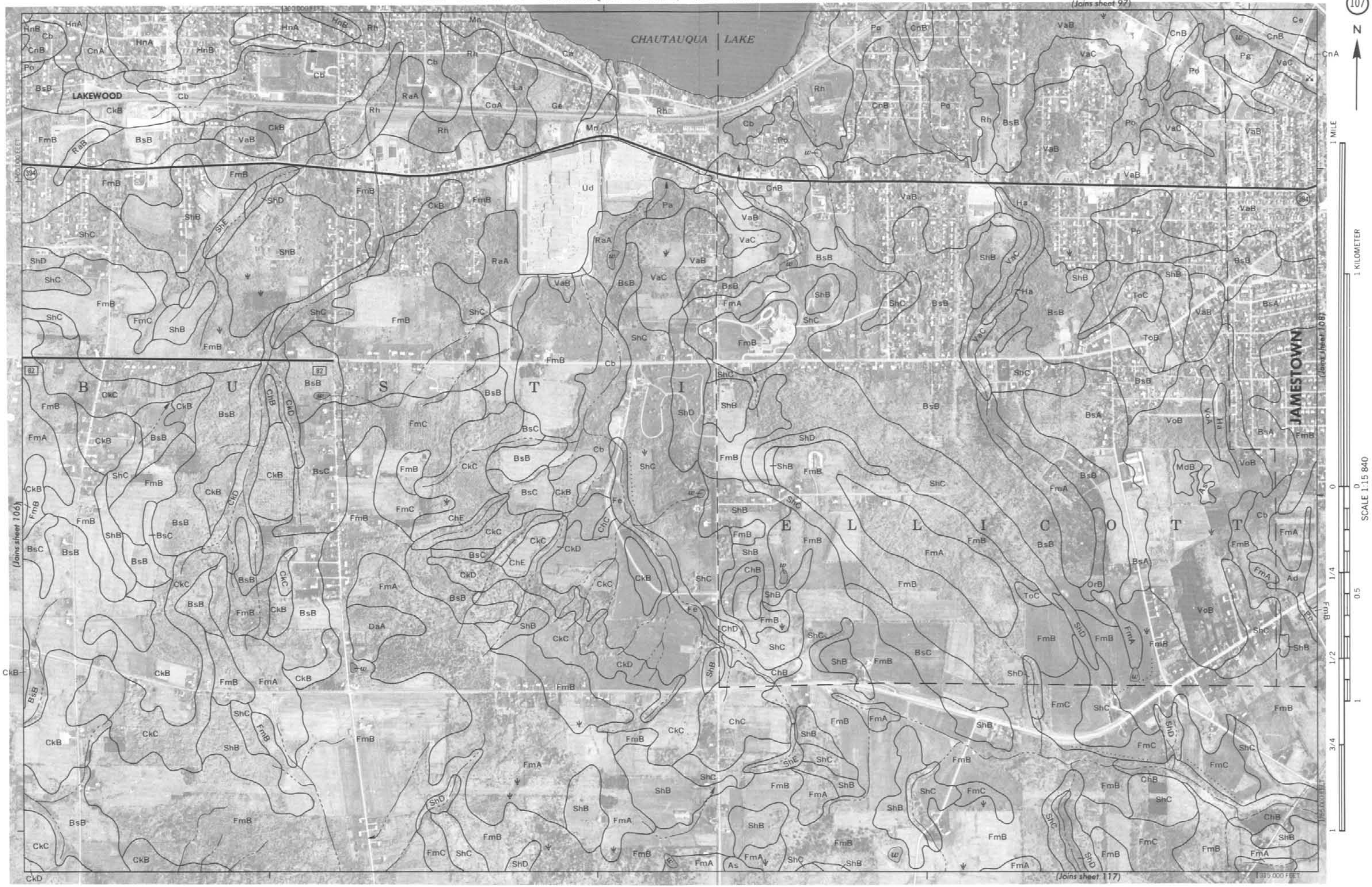

N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 92)
(Joins sheet 101)
(Joins sheet 103)
(Joins sheet 112)
215 000 FEET
200 000 FEET
M I N A
S H E R M A N
F R E N C H C R E E K
C L Y M E R
FRENCH CREEK
Parks Brook
Marks Corners


103
N
(Joins sheet 93)
(Joins sheet 104)
(Joins sheet 113)
(Joins sheet 102)
220 000 FEET
235 000 FEET
S H E R M A N
C L Y M E R
North Clymer
Wickwire Corners
Perkins Creek
Bottom
Creek
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


104
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 94)
(Joins sheet 103)
(Joins sheet 105)
(Joins sheet 114)
STATE
REFORESTATION
AREA
N O R T H H A R M O N Y
S H E R M A N
H A R M O N Y
C L Y M E R
water
Little
Brokenstraw
Creek
Goose
Sweet Hill
Panama
474
255 000 FEET
240 000 FEET


105
N
(Joins sheet 95)
(Joins sheet 106)
(Joins sheet 104)
(Joins sheet 115)
260 000 FEET
275 000 FEET
N O R T H H A R M O N Y
H A R M O N Y
Goose Creek
Blockville
474
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 96)
(Joins sheet 105)
(Joins sheet 107)
(Joins sheet 116)
CHAUTAUQUA
LAKE
Shermans
Bay
Maple Point
LAKEWOOD
Shermans Bay
Cottage Park
Ashville
Boomertown
NORTH HARMONY
HARMONY
BUSTI
Goose Creek
water
295 000 FEET
290 000 FEET


107
N
(Joins sheet 97)
CHAUTAUQUA LAKE
LAKEWOOD
JAMESTOWN
B U S T I
E L L I C O T T
(Joins sheet 106)
(Joins sheet 108)
(Joins sheet 117)
1 300 000 FEET
315 000 FEET
394
82
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

108

N

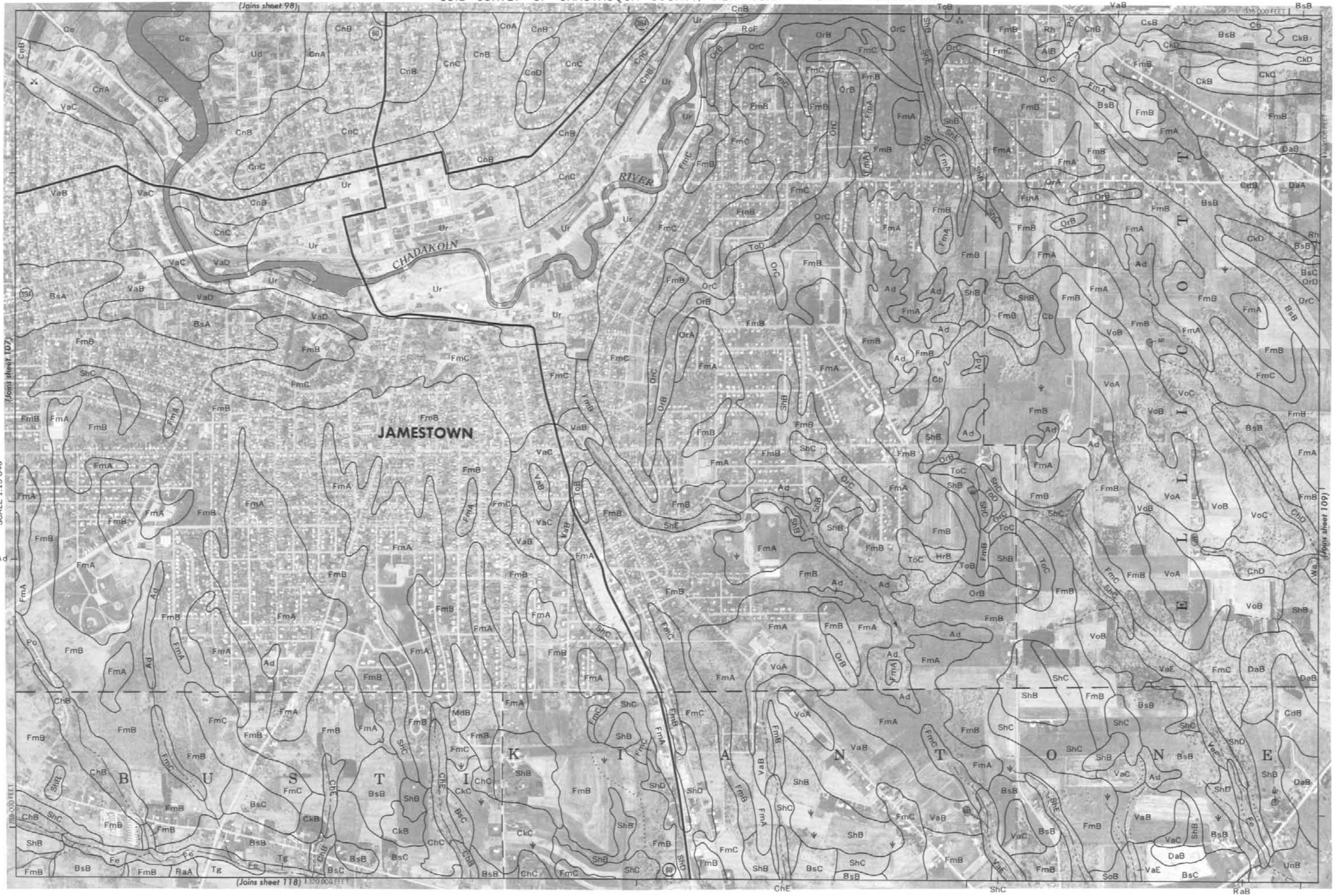
1 MILE

1 KILOMETER

SCALE 1:15 840

0 — 1/4 — 1/2 — 3/4 — 1

0 — 0.5 — 1



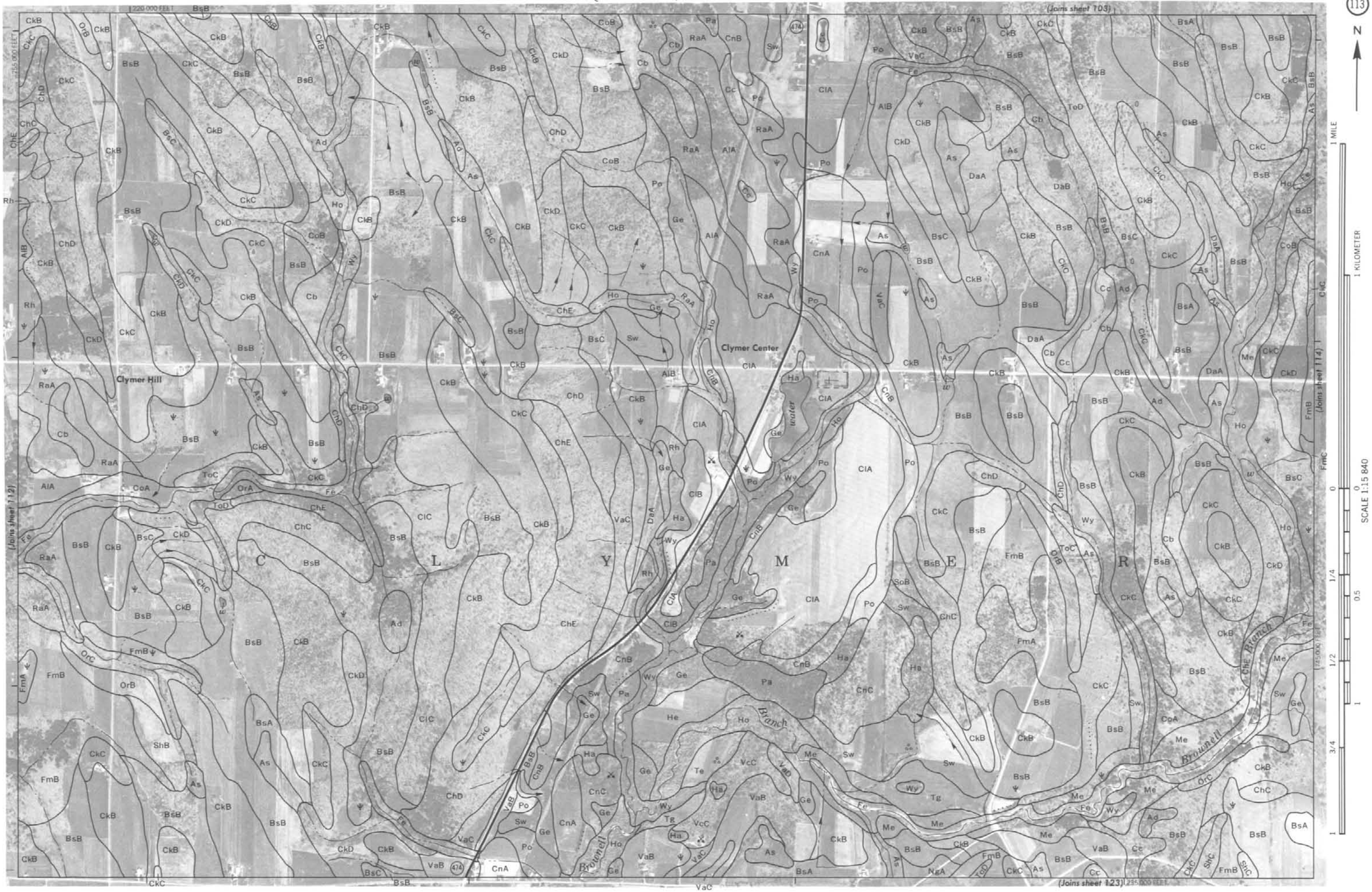

109
N
(Joins sheet 99)
(Joins sheet 110)
(Joins sheet 119)
(Joins sheet 108)
POLAND
CARROLL
KIANTONE
CASSADAGA
CONEWANGO CREEK
CONEWANGO
CREEK
Cass Run
62
1 MILE
1 KILOMETER
SCALE 1:15 840
340 000 FEET
350 000 FEET
760 000 FEET


110
N
(Joins sheet 100)
(Joins sheet 109)
(Joins sheet 120)
P O L A N D
C A R R O L L
CATTARAUGUS COUNTY
Cass Run
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
355 000 FEET
755 000 FEET


111
N
(Joins sheet 101)
(Joins sheet 112)
(Joins sheet 121)
F R E N C H C R E E K
French Creek
Marvin
PENNSYLVANIA
ERIE COUNTY
Black Brook
French Creek
Beaver Meadow Brook
Cutting Brook
426
1 MILE
1 KILOMETER
SCALE 1:15 840


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 102)
(Joins sheet 111)
(Joins sheet 113)
(Joins sheet 122)
215 000 FEET
200 000 FEET
Morgan Corners
F R E N C H C R E E K
C L Y M E R
Beaver Meadow Brook
Parks Brook

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 113




N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 104)
(Joins sheet 113)
(Joins sheet 115)
(Joins sheet 124)
255 000 FEET
240 000 FEET
Sweet Hill
King Corners
H A R M O N Y
C L Y M E R
STATE
REFORESTATION
AREA
STATE REFORESTATION AREA
Brownell Branch
Brownell
Branch
Brokenstraw
Creek
Little Brokenstraw


115
N
(Joins sheet 105)
(Joins sheet 116)
(Joins sheet 125)
(Joins sheet 114)
260 000 FEET
275 000 FEET
H A R M O N Y
STATE
REFORESTATION
AREA
Watts Flats
Little Brokenstraw Creek
East Branch
1 MILE
1 KILOMETER
SCALE 1:15 840


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 106)
(Joins sheet 115)
(Joins sheet 117)
(Joins sheet 126)
280 000 FEET
295 000 FEET
745 000 FEET
750 000 FEET
H A R M O N Y
B U S T I
Goose Creek
Brokenstraw Creek
East Branch
Little
water


117
N
(Joins sheet 107)
(Joins sheet 116)
(Joins sheet 118)
VaB (Joins sheet 127)
300 000 FEET
745 000 FEET
315 000 FEET
B
U
S
T
I
Hatch
Creek
Busti
Stillwater
Creek
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


118
N
(Joins sheet 108)
(Joins sheet 117)
(Joins sheet 119)
(Joins sheet 128)
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
335 000 FEET
320 000 FEET
750 000 FEET
745 000 FEET
B U S T I
K I A N T O N E
Stillwater
Stillwater Creek
60
62


119
N
(Joins sheet 109)
(Joins sheet 118)
(Joins sheet 120)
(Joins sheet 129)
Frewsburg
CARROLL
KIANTONE
CONEWANGO CREEK
Stillwater Creek
Frews Run
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


120
N
(Joins sheet 110)
(Joins sheet 119)
(Joins sheet 130)
CARROLL
CATTARAUGUS COUNTY
Cass Run
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
370 000 FEET
745 000 FEET
765 000 FEET
755 000 FEET


(Joins sheet 111)
(Joins sheet 122)
121
N
FRENCH CREEK
F R E N C H C R E E K
Herrick Creek
Cutting Brook
ERIE COUNTY PENNSYLVANIA
PENNSYLVANIA
ERIE COUNTY
180 000 FEET
190 000 FEET
740 000 FEET
720 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 112)
(Joins sheet 121)
(Joins sheet 123)
215 000 FEET
730 000 FEET
1 200 000 FEET
HOLLAND CEMETERY
Clymer
C L Y M E R
F R E N C H C R E E K
water
Cutting Brook
Hare Cr
Lathrup
Gulf
Brokenstraw Cr
ERIE COUNTY PENNSYLVANIA

(Joins sheet 113)
(Joins sheet 124)
(Joins sheet 122)
123
N
CLYMER
Joquins
Brokenstraw
Brownell
Branch
Creek
ERIE CO PA
WARREN COUNTY PENNSYLVANIA
1 MILE
1 KILOMETER
SCALE 1:15 840


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 114)
(Joins sheet 123)
(Joins sheet 125)
STATE
REFORESTATION
AREA
H A R M O N Y
C L Y M E R
Brokenstraw
Creek
water
WARREN
COUNTY
PENNSYLVANIA
240 000 FEET

SOIL SURVEY OF CHAUTAUQUA COUNTY, NEW YORK — SHEET NUMBER 125


(Joins sheet 116)
(Joins sheet 125)
(Joins sheet 127)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
HARMONY
BUSTI
280 000 FEET
740 000
WARREN COUNTY PENNSYLVANIA


127
N
(Joins sheet 117)
(Joins sheet 128)
(Joins sheet 126)
300 000 FEET
815 000 FEET
B U S T I
Stillwater Creek
WARREN COUNTY PENNSYLVANIA
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


(Joins sheet 118)
(Joins sheet 127)
(Joins sheet 129)
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
335 000 FEET
720 000 FEET
320 000 FEET
B U S T I
K I A N T O N E
Kiantone
York
Run
WARREN COUNTY PENNSYLVANIA
82


(Joins sheet 119)
(Joins sheet 128)
K I A N T O N E
C A R R O L L
CONEWANGO
CREEK
Kiantone
Creek
York
Run
Wiltsie
Run
water
Fentonville
Sturdevant Hill
WARREN COUNTY PENNSYLVANIA
N
1 MILE
1 KILOMETER
SCALE 1:15 840


130
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 120)
(Joins sheet 129)
Frews Run
Wittsie Run
Storehouse Run
C A R R O L L
CATTARAUGUS COUNTY
WARREN COUNTY PENNSYLVANIA
370 000 FEET
740 000 FEET
720 000 FEET
355 000 FEET